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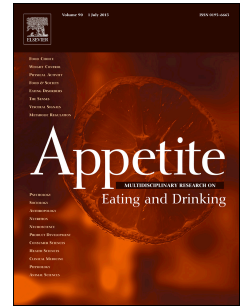
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Attitudes towards honey among Italian consumers: a choice experiment approach

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1 Attitudes towards honey among Italian consumers: a choice experiment 2 approach

3

4 Abstract

5 Honey is becoming increasingly popular with consumers for its nutritional benefits as well as
6 many other functions. The objective of this article is to determine which factors influence
7 consumers' purchase intentions and to assess the importance of certain honey characteristics to
8 enable identification of the constituents of an ideal honey profile. This information will lead to
9 satisfaction of consumers' preferences and formulation of marketing strategies that support
10 honey makers.

11 We applied a choice experiment to the Italian honey market to define the preferences and the
12 willingness to pay for key characteristics of the product. A face-to-face questionnaire survey
13 was conducted in 2014 (January–July) among Italian consumers; it was completed by 427
14 respondents. A latent class model was estimated and four classes were identified, with different
15 preferences, illustrating that respondents seem to be heterogeneous honey consumers. Results
16 suggest the “organic” attribute was more important than others factors, such as the place where
17 the honey was produced (landscape), but less important than the country of origin; local Italian
18 honey was preferred to foreign honey. Respondents showed a higher willingness to pay (WTP)
19 for honey from their country of origin versus the production method used. Our results suggest
20 that while organic beekeeping might be an important strategy for diversification, if suitable
21 communication is not taken into consideration, the added value of the production method
22 might not be perceived by consumers.

23

24 *Keywords:* honey, consumer preferences, choice experiment, marketing.

25

26 Introduction

27 In 2013, global production of honey was about 1.66 million metric tons, and in
28 Europe, annual production reaches about 372 thousand tons (204 thousand tons in the
29 European Union) (FAOSTAT, 2015). The average production of honey in Italy ranges from 9
30 to 12 thousand tons (FAOSTAT, 2015), depending on meteorological conditions during the
31 year.

32 Honey is becoming increasingly popular with consumers for its nutritional benefits as
33 well as many other functions (Aparna & Rajalakshmi, 1999; Al-Qassem & Robinson, 2003;
34 Bogdanov *et al.*, 2008; Ismaiel *et al.*, 2014; Joshi, 2008). Moreover, as health consciousness
35 has increased and concerns have focused on food processing technologies (Anton *et al.*,
36 2010), consumption of honey has increased because it is not subjected to any technological
37 processes (Ghorbani & Khajehroshanaee, 2009; Pocol & Teselios, 2012).
38 Despite this positive consumption situation, the beekeeping sector in Italy has not yet learned
39 to understand the consumers' needs in order to increase their product satisfaction and earnings
40 (Sillani & Grillenzoni, 2007).

41 According to the literature, there are various factors that influence consumers when
42 purchasing honey. However, the decision is often habitual and dictated by knowledge of the
43 honey's value. For example, Yeow *et al.* (2013) have determined several factors that
44 influence consumers' purchasing behaviours regarding honey-related products such as bee
45 pollen, royal jelly and honey drinks. In detail, they stated that medical conditions, quality of
46 the product, brand reputation and pricing have a positive and significant relationship with
47 Asian consumers' purchasing behaviour. Likewise, Ismaiel *et al.* (2014) and Zulail *et al.*
48 (2014) analysed the major factors influencing consumption, expenditure patterns and demand
49 for honey in Saudi Arabia, finding the major motivations for consuming honey are its
50 medicinal and nutritional values. While investigating consumer behaviour in Romania,
51 Arvanitoyannis and Krystallis (2006) identified four main dimensions in honey-purchasing
52 motivation: medical benefits of its consumption, dietary quality, the ethical character of honey
53 and suitability with food consumption lifestyle.

54 Unnevehr & Gouzou's (1998) analysis of the US retail honey market indicated that
55 consumers were willing to pay substantial premiums for honey based on form, container,
56 brand and, in particular, unique monofloral sources. Similarly, Swanson & Lewis (1991)
57 demonstrated that consumers were willing to pay for the unique characteristics of honey
58 associated with particular floral sources, while Gambaro *et al.* (2007) found that consumers
59 showed significantly different degrees of approval of the colour of the evaluated honeys.

60 Jensen & Mørkbak (2013) used principal components analysis and multinomial logit
61 analysis to explore the role of gastronomic, externality and feasibility dimensions in the
62 formation of consumers' values and product perceptions. They also used these methods to
63 determine the importance of the respective dimensions in consumers' choices of local and/or
64 organic varieties of honey and apples. They found that perceived gastronomic quality is the
65 most important determinant for food choice, but externality and feasibility aspects are also

66 important correlates. Ghorbani & Khajehroshanaee (2009) surveyed the consumer demand for
67 qualitative factors of honey using the hedonic pricing (HP) model and cross-sectional data
68 from a consumer sample. Their results showed that the type of honey, as well as its packing
69 conditions, colour, aroma and protraction, have positive effects on its price. Murphy *et al.*
70 (2000) used least squares regression to estimate part worths for the conjoint analysis and
71 found that price and texture were felt to be the most important product attributes, followed by
72 packaging, scale of production and, finally, the honey's colour. Mohamadi-Nejad (2013),
73 using the qualitative pricing model, studied the demand for honey in urban areas of the
74 Kermanshah province of Iran. This study showed that physical and chemical characteristics of
75 honey affect its market price. Characteristics such as scent, production location and high
76 traction significantly positively affect its price, while characteristics like proper packaging,
77 bright colours and types of honey (with wax) can have significant negative effects on its
78 market price. As one of the few studies to analyse willingness to pay (WTP) for honey, Wu *et*
79 *al.* (2014) used auction experiments. They elicited consumer WTP for honey to compare
80 auction and posted-price mechanisms and found that WTP estimates generated by an auction
81 were approximately 50% lower than those from a posted-price mechanism.

82 Many studies have also stated that a honey's origin is the most important factor
83 considered prior to purchase. Batt & Liu (2012) found that in purchasing honey from a retail
84 store (exploratory factor analysis revealed), there were three principal constructs most
85 influential in the purchase decision: brand reputation, origin and value for the money. A study
86 conducted by Roman *et al.* (2013) showed that most consumers said they only purchase honey
87 with domestic origin, although almost half of them said they had not checked the provenance
88 on the label. Likewise, Pocol & Bolboacă (2013) found that respondents preferred to buy
89 honey from a local Romanian producer and had more knowledge in domestic rather than
90 imported honey. Gyau *et al.* (2014) identified key consumer characteristics that influence
91 preferences of honey consumers in the Democratic Republic of Congo; they showed that
92 consumers who are married and have reached at least the level of secondary education have a
93 strong preference for local forest and savannah honey. Moreover, Wu *et al.* (2014) evaluated
94 consumer behaviour related to informational messages about honey that is produced locally,
95 domestically and internationally and demonstrated that consumers prefer locally produced
96 honey.

97 Nevertheless, sufficient clarification has not been established as to which is the best
98 strategy for differentiating honey productions that emphasise increasing producers' earnings.
99 A number of studies have investigated processing, storage and shelf life of organic honey.

100 Parvanov & Dinkov (2012) recommended more specific conditions for processing, storage
101 and production of honey to preserve its natural organoleptic, physical, chemical and
102 antibacterial features. According to Belay *et al.* (2015), many consumers still think that if
103 honey has crystallized it has gone bad or has been adulterated with sugar, but granulation is
104 one of the characteristics for honey. In fact, the ongoing process of crystallization applies to
105 all honeys (Roman *et al.*, 2013).

106 Few studies have investigated consumer attitudes towards organic honey, yet this
107 could be an alternative strategy to verify whether organic production would be preferred to
108 other strategies such as geographic origin. For example, Ványi *et al.* (2011) suggested that (in
109 addition to price, food quality, healthy lifestyle and nutrition) food safety, organic options and
110 animal welfare awareness influenced consumer decision-making.

111 Perception of landscape feature of production is quite a complex phenomenon as it
112 involves a number of components of the human mind, and has an important emotional value
113 (Tempesta *et al.*, 2010). While the international literature (Tempesta *et al.*, 2010; Veale and
114 Quester, 2008) has demonstrated that associating wine to an image of greater visual impact
115 can positively affect the wine quality perception, the analysis of the premium price for
116 landscape features of beekeeping has not yet been investigated.

117 Moreover, to our knowledge, there are only a few studies regarding honey and choice
118 experiments (CE). CEs have been extensively used to understand the determinants of
119 consumers' choice of food products. So far, CE has not been used to investigate the factors
120 potentially shaping the choice of honey in Italy or other countries. The objective of this study
121 is to determine the factors that influence consumers' purchase intentions and to assess the
122 importance given by consumers regarding honey's five primary characteristics: country of
123 origin, landscape features of production, crystallisation, production method—organic or
124 conventional—and price. These are needed to identify an ideal honey profile to satisfy
125 consumers' preferences and formulate marketing strategies that support honey makers.
126 Specifically, we used a choice experiment approach to evaluate Italian consumers' WTP to
127 select honey attributes, incorporating consumer preference heterogeneity in a latent class
128 model (LC). In accordance with this objective, we carried out a survey in Friuli Venezia
129 Giulia, a North-Eastern region in Italy.

130 This study contributes to the literature not only by providing estimates on Italian
131 consumer WTP for premium honey, but also examines consumers' preferences towards local
132 honey compared to domestic and international alternatives. Additionally, it provides insights
133 on their specific perceptions about the organic and local origin of honey. To better assess

134 WTP for local origin, it was decided to conduct interviews in a single region. Understanding
135 these product-organic-origin interactions may illustrate the best marketing opportunities for
136 domestic growers, especially for small farms in particular, who would otherwise compete
137 with foreign producers on simple low-cost criteria. The paper is organized as follows: Section
138 2 provides a short overview of the theoretical background; section 3 describes the methods
139 and materials used; section 4 presents the results; and section 5 includes the discussion of
140 results and concluding remarks.

141

142 **Material and methods**

143 This study used, for exploratory purposes, the Multinomial Logit Model (MNL) and
144 examined a random effect specification by implementing an LC model. Unlike the traditional
145 MNL, where consumers are assumed to be homogeneous, here, heterogeneity in consumer
146 preferences for honey attributes was measured using the LC model. In spite of the traditional
147 logit, this model relaxed the limitations by offering particular flexibility to accommodate
148 respondents' differences in decision strategies and choice consistency, which would otherwise
149 lead to biased part worth utilities (Hensher, 2010; Hess *et al.*, 2013; McFadden & Train,
150 2000). The increasing use of LC and random parameter logit (RPL) models for the analysis of
151 choice experiments in food contexts has been underpinned by a recognition of the
152 heterogeneity in consumers' preferences and the desire to make this heterogeneity relevant for
153 marketing segmentation purposes. In the context of segmented samples of respondents, LC
154 analysis proves to be particularly suited. It groups respondents by looking at common choice
155 patterns rather than clustering the sample on socio-economic characteristics.

156 By looking at the marginal rate of substitution between non-monetary and monetary
157 attributes included in the indirect utility function (IUF) it was possible to estimate the premium
158 price (or willingness to pay – WTP) for each attribute level by dividing β coefficients by
159 β_{price} :

$$160 \quad \text{WTP} = - \beta / \beta_{\text{price}}$$

161 As the utility function is assumed to be linear in cost, the marginal WTP for the
162 attribute is the ratio between the parameter of the attribute and the cost parameter in the utility
163 function.

164

165 ***Experimental Design***

166 A face-to-face questionnaire survey, divided into three parts, was conducted in 2014
 167 (January-July) among Italian consumers. Data were collected in shopping centers so that the
 168 survey could at least partly mirror the point-of-sale context. People were addressed according
 169 to a simple random rule. In accordance with the objectives of our study, the survey, including
 170 the CE, was administered in Friuli Venezia Giulia. It was completed by 427 respondents.

171 The first part of questionnaire collected respondents' socio-economic information,
 172 and they were also asked about their general opinions and experience regarding honey-related
 173 consumption habits. It was decided to insert a number of questions about organic produced
 174 food and -honey, asking the frequency and place for the purchase. These questions, along with
 175 those on the consumption of honey, constitute our reference framework for the potential
 176 consumer of organic honey in order to verify if organic beekeeping might be a strategy for
 177 diversification. Next, the CE was introduced, and the attributes with corresponding levels
 178 were repeated briefly before each respondent was faced with the choice sets.

179 A focus group was conducted in a single round with a number of consumers and
 180 producers of honey in order to identify the attributes and discuss questions in the
 181 questionnaire. Based on the focus group discussion, five attributes were identified (Table 1),
 182 which were considered to be important for consumers, but which did not make them
 183 differentiate between various types of honey.

184
 185

Attribute	Levels
Geographic origin	Friuli Venezia Giulia Region; other Italian regions; other countries
Honey crystallisation	Liquid (runny) state; semi-solid state
Organic	Yes; no
Landscape	Evocative landscape; beehives near industrial buildings; skyscraper hives
Price (€/500 gr.)	3; 5; 9

186 *Table 1 – Attributes and their corresponding levels*

187
 188 The first attribute we considered was the geographic origin of honey, which seemed to
 189 be a preferred characteristic of consumers across all countries (Kehagia *et al.*, 2007). The
 190 country of origin attribute had three levels of study: Friuli Venezia Giulia Region, other
 191 Italian regions, and other countries.

192 The second attribute offered respondents the opportunity to choose between liquid
 193 (runny) state honey or semi-solid state honey. Honey is susceptible to crystallisation, which

194 occurs naturally. Crystallisation is affected by three major factors: floral origin of the nectar;
195 high contents of fructose (generally, honeys with very high contents of fructose remain liquid
196 for a longer time (Yao *et al.*, 2003); and the organic honey production method.



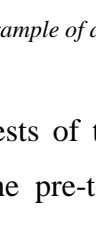
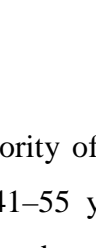

197 An increasing interest and concern among consumers in the ways in which food is
198 produced has led to a need for differentiation in production methods. Consequently, we
199 considered two different levels for this attribute: organic or non-organic. Organic production
200 means the production process has followed the rules established by EU Regulations (CE) N.
201 834/2007 and 889/2008.

202 With regard to landscape features of beekeeping, the fourth attribute, we used three
203 levels: i) intensive beekeeping carried out with a large numbers of colonies concentrated in
204 small areas, which enables large yields but damages landscape beauties; ii) an industrial site
205 where an apiary is located; and iii) traditional bee hives in a beautiful mountain landscape.
206 The proposed landscapes were all created with Gimp software tools (<http://www.gimp.org>).
207 They were selected among a larger group of images, which were shown to focus group
208 participants according to the hypothesis that the landscape in which the honey is produced
209 could affect quality product perception (Kaplan, 1985). According to Daniel (2001), the
210 selected images were then shown to a sample of 50 citizens to obtain their appreciation. A 5
211 point Likert scale was used to score each image (ranging from 1, “not pleasant”, to 5, “very
212 pleasant”). The mountain landscape reached the highest average score, while the environment
213 with intensive beekeeping obtained the lowest result. By using appropriate statistical tests the
214 global significance difference among the three levels of the landscape attribute was
215 confirmed. In addition the differences among the average scores were shown to be statistically
216 significant. Consequently we decided to use the selected images for the CE.

217 The price attribute had the levels € 3, € 5 and € 9. This corresponded to a 550 gr. glass
218 jar.

219 To elicit consumer preferences for the attributes efficiently, a fractional factorial
220 design was used to vary all attributes among the scenarios. A final set of 18 treatment
221 combinations has been derived. Respondents had to face 6 choice sets with 3 treatment
222 combinations each plus the opt-out alternative (“None of these”). The choice sets were shown
223 in colour pictures to the respondents. In detail, the respondents were asked to choose among
224 three jars of honey. An example of a choice set is illustrated in Figure 1.

225

Scenario 1	Option A	Option B	Option C	Option D
Price (€/500 g.)	€ 3	€ 5	€ 9	
Geographic origin	Friuli Venezia Giulia Region	Other Italian regions	Other countries	None
Honey crystallisation	Semi-solid state	Semi-solid state	Liquid (runny) state	of these
Organic				
Landscape				
I would choose: (Please mark only one box) →	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

226
227 *Fig. 1 – Graphical example of a choice set*

228
229 About 50 pre-tests of the questionnaire were made before it was administered to the final
230 respondents. The pre-tests resulted in a number of minor changes in the formulation of
231 questions.

232
233 **Results**

234 The majority of the respondents were female (55%). Most respondents (45%) were
235 aged between 41–55 years. 51% of respondents lived in a household with three to four
236 members. Respondents were mainly employed (68%). Table 2 presents the descriptive
237 statistics used in the estimations.

238
239

		Sample	Friuli V.G. Region		Italy
		N°	%	%	%
Gender	Male	192	44.96	48.2	48.8
	Female	235	55.04	51.8	51.1
Age	Less than 25 years	40	9.37	20.9	24.0
	Between 25 and 40 years	136	31.85	20.0	21.2
	Between 41 and 55 years	192	44.96	23.2	22.8
	Between 56 and 70 years	52	12.18	19.3	17.5
	More than 70 years	7	1.64	16.5	14.5
Family members	1-2		40.52	65.1	51.9
	3-4		50.82	31.1	40.6
	5 and more		8.67	3.8	7.5

Educational level	Primary and lower secondary	50	11.71	49.4	55.0
	Secondary	188	44.03	37.9	33.9
	Graduate	164	38.41	12.7	11.1
	Other	25	5.85	/	/
Employment status	Employed	355	83.14	63.2	56.8
	Non-employed	72	16.86	36.8	43.2

240 *Table 2 – Interviewee and population characteristics*

241

242 More than 90% of the respondents stated that they consumed honey, however, the
 243 majority (49.35%) consumed it only occasionally. Buying honey directly from the beekeeper
 244 was widespread among respondents, but for 36.20%, the supermarket was the primary place
 245 of purchase. Of the 65.71% who declared their preference for liquid (runny) honey, 72.95% of
 246 them regularly or rarely bought organic honey.

247 By means of the program NLogit4®, MNL and LC models were estimated. Both
 248 models shared the same following linear utility function.

249 In Table 5, the relative marginal utility of the attributes of the entire sample can be
 250 analysed. The coefficients were all significant at a 90 or 95% confidence level (P value). The
 251 marginal utility of local honey production was higher than that of organic production.
 252 Estimates indicate that respondents are also concerned about landscape features of production
 253 and liquid state of honey. The coefficient of the price attribute is negative as expected and
 254 postulated by theory as consumer prefers the less expensive alternative *ceteris paribus*.

255 According to Lancsar et al. (2007) the relative impact of each honey attribute was
 256 analysed using partial log-likelihood values (Table 3). The results indicate that the geographic
 257 origin was ranked at the top, and accounted for 72.9% of the log-likelihood. This attribute was
 258 followed by price, organic, landscape of production, and honey crystallization.

259

260

Honey attributes	Partial effect	Attribute importance (%)
Origin	-272.26	72.9
Price	-69.75	18.7
Organic	-27.00	7.2
Landscape	-2.88	0.8
Crystallization	-1.57	0.4

261 *Table 3 – Ranking of attribute importance*

262

263 A LC model was estimated on the respondents for testing for latent heterogeneity in
 264 honey choices and preferences in order to consider the possibility of segmentation of

265 preferences into different consumer groups. In fact, LC model is quite informative and
 266 interesting when studying preferences heterogeneity of respondents In detail, LC model
 267 determines empirically the typologies of consumers/respondents according to their
 268 homogeneity of preferences derived from the choices made, independently of their socio-
 269 economic characteristics.

270 Results from the LC model are reported in Table 5. The number of segments was
 271 defined exogenously. The class four model was then selected by comparing LL function, AIC
 272 and BIC for different numbers of classes (Table 4).

273

274

	LCM-2	LCM-3	LCM-4	LCM-5
LL	-2780.398	-2665.518	-2576.875	-2562.647
AIC	2.184	2.103	2.041	2.038
BIC	2.223	2.167	2.128	2.148
HQIC	2.199	2.126	2.072	2.078
McFadden pseudo R ²	.217	.249	.274	.278

275 *Table 4 – Latent class model statistics*

276

277 While LC model results confirm the MNL results trend, they highlight a differentiated
 278 set of preferences among respondents. The class four LCM model (LCM-4) showed that the
 279 sample had heterogeneous preferences and respondents could be divided into four classes,
 280 representing 19%, 35%, 20% and 26%, respectively. It is interesting to observe how the
 281 coefficients for class one are not significant ($p > 0.05$) apart from the local origin. The
 282 members of this class who chose the most preferred alternatives considered only the local
 283 origin of honey and seemed indifferent to the other attributes considered in our experiment
 284 (“localists”).

285 Each of the other three classes were characterised by a different structure of
 286 preferences: members of class two were more concerned about organic beekeeping and
 287 negative landscape externalities of intensive production, while members of class three
 288 preferred more liquid (runny) honey and intensive beekeeping. We will refer to members of
 289 class two as “environmentally friendly consumers” and members of class three as “pro-
 290 intensive production consumers”, although they had a positive WTP for organic production.
 291 Furthermore, members of class three had, on average, a higher WTP for all attributes except
 292 local origin. Looking at class four, we noticed that people belonging to that class gave more
 293 importance to the physical property of “liquid” honey and organic beekeeping. They could be

294 defined as “organic consumers”. Regarding product origin, all the groups preferred honey
 295 produced in Friuli Venezia Giulia. Considering the landscape externalities of production
 296 attribute, classes three and four preferred intensive beekeeping (WTP € 7.02 and € 4.51,
 297 respectively), while members of class two had a negative WTP. Consumers belonging to class
 298 two preferred crystallised honey, while members of classes three and four showed a positive
 299 WTP for a liquid consistency (WTP € 8.02 and € 6.20 respectively).

300 Although in a preliminary step we included socio-demographic and behavioural
 301 variables in the LC model to better explain class probability, we found that they were not
 302 generally significant in explaining the probability of class membership. We retained the most
 303 significant socio-demographic variable, the 25-40 age group. This variable had a positive
 304 coefficient relative to the first class.

305

306

Variable	MNL	Latent Class Model							
	Coeff. (S.E.)	Class 1		Class 2		Class 3		Class 4	
		Coeff. (S.E.)	WTP (€/jar)	Coeff. (S.E.)	WTP (€/jar)	Coeff. (S.E.)	WTP (€/jar)	Coeff. (S.E.)	WTP (€/jar)
ASC	-0.25 (0.12)***	0.46 (0.97)	/	-2.86 (0.22)***	/	-0.56 (0.23)***	/	2.51 (0.24)***	/
Price	-0.15 (0.01)***	-0.08 (0.14)	/	-0.27 (0.02)***	/	-0.10 (0.02)***	/	-0.26 (0.03)***	/
FriuliV.G.	1.04 (0.07)***	5.73 (2.07)***	/	1.04 (0.11)***	3.91	0.51 (0.11)***	4.97	1.28 (0.15)***	4.86
Foreign	-0.58 (0.12)***	0.11 (1.46)	/	-1.69 (0.21)***	-6.31	0.25 (0.16)	/	-0.83 (0.27)***	-3.14
Liquid	0.16 (0.09)**	1.13 (0.99)	/	1.15 (0.21)***	4.29	0.68 (0.18)***	6.65	1.57 (0.23)***	5.95
Organic	0.81 (0.11)***	-2.42 (1.64)	/	-1.28 (0.19)***	-4.81	0.82 (0.13)***	8.02	1.64 (0.16)***	6.20
Evocative	0.14 (0.08)**	-0.32 (0.71)	/	0.23 (0.17)	/	0.34 (0.11)***	3.30	0.63 (0.16)***	2.40
Intensive	0.16 (0.10)**	-1.01 (1.77)	/	-0.40 (0.14)***	-1.51	0.72 (0.15)***	7.02	1.19 (0.19)***	4.51
Average probability		0.19		0.35		0.20		0.26	
Theta in class probability model: 25-40 age group		0.61 (0.33)**		-0.01 (0.30)		0.10 (0.36)		0.00 (fixed parameter)	

307 *** Significant at a 95% conf. level; ** Significant at a 90% conf. level.

308 *Table 5 – Base model and latent class model results*

309

310 The ASC was significant ($P < 0.05$) for classes two, three and four, but negative for
 311 classes two and three, meaning there were preferences towards the ‘none’ option, which could
 312 not be explained by the variables contained in the model. For class four, the ASC was
 313 positive.

314

315 Discussion and Conclusions

316 The Italian beekeeping sector has not yet learned to understand the consumers' needs
317 in order to increase their product satisfaction and earnings. In this context, new strategies like
318 organic beekeeping could be an opportunity to diversify the product and acquire a margin to
319 improve earning capacity.

320 Our study provides initial empirical evidence for this opportunity.

321 Four classes were identified, with different preferences, illustrating that respondents
322 seem to be heterogeneous honey consumers.

323 The results revealed strong positive preferences for locally produced honey. In fact, the
324 country of origin had a substantial effect on the interviewees' utility along all classes. This
325 result also emerged in other research, where respondents tended to prefer products from their
326 home region (Al-Ghamdi, 2007; Troiano, *et al.*, 2014; Wu, *et al.*, 2014; Zulail *et al.*, 2014).
327 The WTP estimates for honey produced in Friuli Venezia Giulia were positive and quite
328 consistent in comparison to production abroad. The propensity to purchase food of local
329 origin may have a plurality of explanations (Troiano *et al.*, 2014). It could be assumed that
330 local food products are preferred especially by environmentally-conscious consumers because
331 they are more environmentally benign. In addition, they are generally produced by local
332 producers respecting local traditions. Moreover, it could be also assumed the presence of an
333 altruistic component regarding the opportunity to empower local socio-economic system
334 through the purchase of local products.

335 Nevertheless, the results show that WTP for organic honey was higher, except in class
336 one, meaning that only a small fraction of the interviewees was not willing to pay a premium
337 price for organic production. These results are in line with Kehagia *et al.* (2007), who stated
338 that Italian respondents insisted on organic honey and considered the origin of honey to be
339 important as well. If organic honey buyers are considered more responsible for their own
340 health and more likely to undertake preventive health action than the general population
341 (Makatouni, 2002), our results identify organic production of honey as a driving opportunity
342 for beekeeping. In fact, Ismaiel *et al.* (2013) evidenced that the trend of consuming honey as a
343 health food has been steadily increasing. This could be a key factor of the expected growth in
344 the Italian demand for honey.

345 The implications of this findings for marketing are clear. The emphasis on local origin
346 of honey besides organic production logo may result in increasing demand

347 Moreover, our results suggest the “organic” attribute was more important than the
348 landscape features where production takes place. Although we used a well-known Dolomitian
349 landscape taken from the North-Eastern region in Italy to create one of the proposed
350 (photomontaged) images, we notice it has not developed a particular emotional tie. While
351 Tempesta et al. (2010) stated that associated wine to an evocative landscape induces a
352 significantly higher preference for the tested wine, our findings reveal that a consistent group
353 of respondents (class 3 and 4 - 45%) are more WTP for a landscape characterized by intensive
354 honey production. This may be due to the fact the landscape produced by intensive wine
355 production compared to the one obtained by intensive producing honey are really very
356 different. In detail, the landscape impacts of the intensive production of honey are not
357 permanent. Moreover Italian consumers pay attention on and appreciate winescape resulting
358 from sustainable (not intensive) production methods because of its positive impacts on
359 aesthetic and recreational values. In addition, wine production culture in Italy has a long-
360 standing tradition. However, a considerable group of respondents (class 2 – 35%) had a
361 negative WTP for degraded landscape, in which environmental resources had been obscured
362 by intensive beekeeping.

363 While Murphy et al. (2000) stated the ideal honey profile for Irish consumers of honey
364 was one with a thick texture, in our study findings reveal the presence of significant market
365 segments interested in the liquid consistency of honey, not taking into consideration that
366 crystallisation or granulation are natural phenomena. In fact, most pure raw or unheated honey
367 has a natural tendency to crystallise over time. There is no difference in taste or nutritional
368 value of these two states. Crystallised honey is not spoiled and preserves the characteristics of
369 liquid honey. It can also be restored to a liquid state. Nevertheless a consistent group of
370 respondents (class 3 and 4 – 45%) has a positive WTP for liquid honey. Our results are in
371 line with the study of Kabani *et al.* (2011), who stated that crystallization of honey makes it
372 less appealing to the consumer, who prefers it liquid and/or transparent. Maybe this is due to
373 aa lack of sufficient information regarding the quality properties and physical aspects of
374 honey in general.

375 Some limitations of our research merit emphasis. It is important to extend the research
376 to real consumer behaviour to better understand their preferences. Moreover, it may be useful
377 to extend this research to other states or regions. Despite the limitations of our study, we
378 believe our results add useful data to currently available literature on consumers’ preferences
379 towards honey. In fact, as many of the characteristics of the examined study region may be
380 similar to the characteristics of other Italian and European Regions, the issues of this study

381 may be of interest to researchers and policy makers in such regions. In addition, our findings
382 should be useful for producers in areas where the development of organic honey as niche
383 market product can be an important element for the improvement of the competitiveness of
384 the beekeeping sector and therefore for the increase of its revenues.

385 In conclusion, our results suggest that organic beekeeping might be an important
386 strategy for diversification. Moreover, the findings help producers to understand the
387 opportunity posed by the local marketing trend to organic honey producers and sellers by
388 integrating local resources into their brand value.

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391 **References**

- 392 Al-Ghamdi, A. A. (2007). Beekeeping and honey production in Saudi Arabia. In *5th Annual*
393 *Conference on the Arab Beekeepers Association*. Tripoli, Libya.
- 394 Al-Qassemi, R., & Robinson, R. K. (2003). Some special nutritional properties of honey – a
395 brief review. *Nutrition & Food Science*, 33(6), 254-260.
396 DOI:10.1108/00346650310507073
- 397 Anton, S. D., Martin, C. K., Han, H., Coulon, S., Cefalu, W. T., Geiselman, P., & Williamson,
398 D. A. (2010). Effects of stevia, aspartame, and sucrose on food intake, satiety, and
399 postprandial glucose and insulin levels. *Appetite*, 55(1), 37-43.
400 DOI:10.1016/j.appet.2010.03.009
- 401 Aparna, A. R., & Rajalakshmi, D. (1999). Honey – its characteristics, sensory aspects, and
402 applications. *Food Reviews International*, 15(4), 455-471.
403 DOI:10.1080/87559129909541199
- 404 Arvanitoyannis, I., & Krystallis, A. (2006). An Empirical Examination of the Determinants of
405 Honey Consumption in Romania. *International Journal of Food Science &*
406 *Technology*, 41, 1164-1176. DOI: 10.1111/j.1365-2621.2006.01174.x
- 407 Batt, P. J., & Liu, A. (2012). Consumer behaviour towards honey products in Western
408 Australia. *British Food Journal*, 114(2), 285-297. DOI:/10.1108/00070701211202449
- 409 Belay, A., Solomon, W. K., Bultossa, G., Adgaba, N., & Melaku, S. (2015). Botanical origin,
410 colour, granulation, and sensory properties of the Harena forest honey, Bale,
411 Ethiopia. *Food chemistry*, 167, 213-219.

- 412 Bogdanov, S., Jurendic, T., Sieber, R., & Gallmann, P. (2008). Honey for nutrition and health:
413 a review. *Journal of the American College of Nutrition*, 27(6), 677-689. DOI:
414 10.1080/07315724.2008.10719745
- 415 Daniel, T.C. (2001). Whither scenic beauty? Visual quality assessment in the 21st century.
416 *Landscape and Urban Planning*, 54, 67-281.
- 417 FAOSTAT (2015). Statistics Division – Food and Agriculture Organization of the United
418 Nations. <http://faostat3.fao.org/download/> (accessed 25.01.2015).
- 419 Gambaro, A., Ares, G., Gimenez, A. N. A., & Pahor, S. (2007). Preference mapping of colour
420 of Uruguayan honeys. *Journal of Sensory Studies*, 22(5), 507-519.
421 DOI: 10.1111/j.1745-459X.2007.00125.x
- 422 Gyau, A., Akalakou, C., Degrande, A., & Biloso, A. (2014). Determinants of Consumer
423 Preferences for Honey in the Democratic Republic of Congo. *Journal of Food*
424 *Products Marketing*, 20(5), 476-490. DOI: 10.1080/10454446.2013.807405
- 425 Ghorbani, M., & Khajehroshanaee, N. (2009). The Study of Qualitative Factors Influencing
426 on Honey Consumers Demand: Application of Hedonic Pricing Model in Khorasan
427 Razavi Province. *Journal of Applied Sciences*, 9, 1597-1600.
428 DOI:10.3923/jas.2009.1597.1600
- 429 Hensher, D. A. (2010). Quality cue processing, heuristics and preference construction in
430 choice analysis. In Hess., S., & Daly, A. (Eds.), *Choice modelling: The state-of-the-art*
431 *and the state-of-practice* (pp. 35-70). UK: Emerald Bingley.
- 432 Hess, S., Shires, J., & Bonsall, P. (2013). A latent class approach to dealing with respondent
433 uncertainty in a stated choice survey for fare simplification in bus journeys.
434 *Transportmetrica A: Transport Science*, 9(6), 473-493.
435 DOI:10.1080/18128602.2011.609190
- 436 Jensen, J. D., & Mørkbak, M. R. (2013). Role of gastronomic, externality and feasibility
437 attributes in consumer demand for organic and local foods: The case of honey and
438 apples. *International Journal of Consumer Studies*, 37(6), 634-641.
439 DOI: 10.1111/ijcs.12049
- 440 Joshi, S. R. (2008). *Honey in Nepal: Approach, Strategy and Intervention for Subsector*
441 *Promotion Income Distribution*. German Technical Cooperation/Private Sector
442 Promotion – Rural Finance. Laliptur, Nepal.
- 443 Kaplan, R. (1985). The analysis of perception via preference: A strategy for studying how the
444 environment is experienced. *Landscape Planning*, 12, 161-176.

- 445 Kabbani, D., Sepulcre, F., & Wedekind, J. (2011). Ultrasound-assisted liquefaction of
446 rosemary honey: Influence on rheology and crystal content. *Journal of Food*
447 *Engineering*, 107(2), 173-178. DOI: 10.1016/j.jfoodeng.2011.06.027
- 448 Kehagia, O., Chrysochou, P., Chryssochoidis, G., Krystallis, A., & Linardakis, M. (2007).
449 European consumers' perceptions, definitions and expectations of traceability and the
450 importance of labels, and the differences in these perceptions by product type.
451 *Sociologia Ruralis*, 47(4), 400-416. DOI:10.1111/j.1467-9523.2007.00445.x
- 452 Ismaiel, S., Al-Kahtani, S., Adgaba, N., Al-Ghamdi, A. A., & Zulail, A. (2014). Factors That
453 Affect Consumption Patterns and Market Demands for Honey in the Kingdom of
454 Saudi Arabia. *Food and Nutrition Sciences*, 2014. DOI: 10.4236/fns.2014.517186
- 455 Lancaster, K. (1966). A new approach to consumer theory. *The Journal of Political Economy*,
456 74(2), 132-157. DOI:10.1086/259131
- 457 Lancsar, E., Louviere, J. & Flynn, T. (2007). Several methods to investigate relative attribute
458 impact in stated preference experiments. *Social Science & Medicine*, 64, 1738-1753.
459 DOI:10.1016/j.socscimed.2006.12.007
- 460 Luce, R. D. (2005). *Individual choice behavior: A theoretical analysis*. New York: Wiley.
461 ISBN 0-486-44136-9
- 462 Lusk, J. L., Roosen, J., & Fox, J. (2003). Demand for Beef from Cattle Administered Growth
463 Hormones or Fed Genetically Modified Corn: A Comparison of Consumers in France,
464 Germany, the United Kingdom, and the United States. *American Journal of*
465 *Agricultural Economics*, 85, 16-29. DOI: 10.1111/1467-8276.00100
- 466 Makatouni, A. (2002). What motivates consumers to buy organic food in the UK? Results
467 from a qualitative study. *British Food Journal*, 104(3/4/5), 345-352. DOI:
468 10.1108/00070700210425769
- 469 McFadden, D. (1974). Conditional Logit Analysis of Qualitative Choices. In P. Zarembka.
470 (Eds.), *Frontiers in econometrics* (pp. 105-142). New York: Academic Press.
- 471 McFadden, D., & Train, K. (2000). Mixed MNL Models for Discrete Response. *Journal of*
472 *Applied Econometrics*, 15, 447-70. DOI: 10.1002/1099-
473 1255(200009/10)15:5<447::AID-JAE570>3.0.CO;2-1
- 474 Mohamadi-Nejad, A. (2013). Estimating the Qualitative Pricing Model of Honey in Iran. *J.*
475 *Basic. Appl. Sci. Res.*, 3(1), 483-487.
476 [http://textroad.com/Old%20Version/pdf/JBASR/J.%20Basic.%20Appl.%20Sci.%20R](http://textroad.com/Old%20Version/pdf/JBASR/J.%20Basic.%20Appl.%20Sci.%20Res.,%203%281s%29483-487,%202013.pdf)
477 [es.,%203%281s%29483-487,%202013.pdf](http://textroad.com/Old%20Version/pdf/JBASR/J.%20Basic.%20Appl.%20Sci.%20Res.,%203%281s%29483-487,%202013.pdf) (accessed 24.01.2015)

- 478 Murphy, M., Cowan, C., Henschion, M., & O'Reilly, S. (2000). Irish consumer preferences for
479 honey: A conjoint approach. *British Food Journal*, 102(8), 585-598. DOI:
480 10.1108/00070700010348424
- 481 Parvanov, P., & Dinkov, D. (2012). More insight into organic bee honey processing, storage
482 and shelf life. *Bulgarian Journal of Veterinary Medicine*, 15(3), 206-210.
483 <http://www.cabi.org/cabdirect/FullTextPDF/2012/20123321207.pdf> (accessed
484 20.01.2015)
- 485 Pocol, C. B., & Bolboacă, S. D. (2013). Perceptions and trends related to the consumption of
486 honey: A case study of North - West Romania. *International Journal of Consumer
487 Studies*, 37(6), 642-649. DOI: 10.1111/ijcs.12046
- 488 Pocol, C. B., & Teselios, C. M. (2012). Socio-Economic Determinants of Honey
489 Consumption in Romania. *Journal of Food, Agriculture & Environment*, 10, 18-21.
490 DOI: 10.1111/ijcs.12046
- 491 Roman, A., Popiela-Pleban, E., Kozak, M., & Roman, K. (2013). Factors influencing
492 consumer behaviour relating to the purchase of honey, part 2. Product quality and
493 packaging. *Journal of Apicultural Science*, 57(2), 175-185. DOI: 10.2478/jas-2013-
494 0027
- 495 Rozin, P., Pelchat, M. L., & Fallon, A. E. (1986). Psychological factors influencing food
496 choice. In Ritson, C., Gofton, L., & McKenzie, J. (eds.), *The Food Consumer* 107-
497 125). Chichester, UK: John Wiley and Sons Ltd.
- 498 Sillani, S., & Grillenzoni, F. V. (2007). Le politiche della qualità del miele e il pricing dei
499 dettaglianti. *APOIDEA*, 4, 35-43, ISSN: 1724-8167
- 500 Swanson, R. B., & Lewis, C. E. (1991). Premiums honeys: Response of sensory panelists,
501 *Food Quality and Preference*, 3(4), 215-221. DOI: 10.1016/0950-3293(91)90036-E
- 502 Tempesta, T., Giancristofaro, R. A., Corain, L., Salmaso, L., Tomasi, D., & Boatto, V. (2010).
503 The importance of landscape in wine quality perception: An integrated approach using
504 choice-based conjoint analysis and combination-based permutation tests. *Food Quality
505 and Preference*, 21(7), 827-836. DOI: 10.1016/j.foodqual.2010.04.007
- 506 Troiano, S., Tempesta, T., & Marangon, F. (2014). Consumer Propensity for Organic Wine:
507 A Field Study Using a Discrete Choice-Experiment in Friuli Venezia Giulia. In
508 *Sustainability of the Agri-food System: Strategies and Performances: Proceedings of
509 the 50th SIDEA Conference. Lecce, Chiostro dei Domenicani, 26-28 September 2013*
510 (p. 125). Universitas Studiorum. DOI:10.14671/9788897683605

- 511 Unnevehr, L. J., & Gouzou, F. C. (1998). Retail premiums for honey characteristics.
512 *Agribusiness*, 14(1), 49-54. DOI: 10.1002/(SICI)1520-
513 6297(199801/02)14:1<49::AID-AGR4>3.0.CO;2-L
- 514 Ványi, G. Á., Csapo, Z., & Karpati, L. (2011). Evaluation of consumers' honey purchase
515 habits in Hungary. *Journal of Food Products Marketing*, 17(2-3), 227-240. DOI:
516 10.1080/10454446.2011.548293
- 517 Veale, R., & Quester, P. (2008). Consumer sensory evaluations of wine quality: the respective
518 influence of price and country of origin. *Journal of Wine Economics*, 3(01), 10-29.
519 DOI: 10.1017/S1931436100000535
- 520 Yao, L., Bhandari, B. R., Datta, N., Singanusong, R., & D'Arcy, B. R. (2003). Crystallisation
521 and moisture sorption properties of selected Australian unifloral honeys. *Journal of*
522 *the Science of Food and Agriculture*, 83(9), 884-888. DOI: 10.1002/jsfa.1421
- 523 Yeow, S. H. C., Chin, S. T. S., Yeow, J. A., & Tan, K. S. (2013). Consumer Purchase
524 Intentions and Honey Related Products. *Journal of Marketing Research & Case*
525 *Studies*, 2013, c1-15. DOI: 10.5171/2013.197440
- 526 Wu, S., Fooks, J., Messer, K., & Delaney, D. (2014). Consumer Demand for Local Honey: An
527 Artefactual Field Experiment. *Applied Economics and Statistics*, University of
528 Delaware, [https://d2vsp3qmody48p.cloudfront.net/wp-](https://d2vsp3qmody48p.cloudfront.net/wp-content/uploads/2014/03/APECRR14-08.pdf)
529 [content/uploads/2014/03/APECRR14-08.pdf](https://d2vsp3qmody48p.cloudfront.net/wp-content/uploads/2014/03/APECRR14-08.pdf)
- 530 Zulail, A., Ismaiel, S., Al-Kahtani, S., Al-Ghamdi, A. A., & Adgaba, N. (2014). Qualitative
531 Factors Affecting the Price and Demand of Honey in Saudi Arabia. *Australian Journal*
532 *of Basic and Applied Sciences*, 8(10), 199-206, ISSN 2309-8414,
533 <http://ajbasweb.com/old/ajbas/2014/July/199-206.pdf>

Highlights

We analyse the preferences of 427 consumers toward organic honey. ► Added value of the organic honey not perceived by consumers without information. ► Consumers show a higher WTP for the country of origin than for the production method. ► Emphasis on local origin besides organic production logo may result in increasing demand.

ACCEPTED MANUSCRIPT