

Cheese liking and consumer willingness to pay as affected by information about organic production

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The present study aimed to assess the effect of information about organic production on Pecorino cheese liking and consumer willingness to pay. Mean scores of perceived liking were similar for organic cheese (OC) and conventional cheese (CC). Expected liking scores were higher for OC than for CC ($P < 0.001$). For OC the expected liking was significantly higher ($P < 0.001$) than the perceived liking expressed in blind conditions (negative disconfirmation), whereas for CC the expected liking was significantly lower ($P < 0.001$) than the perceived liking expressed in blind conditions (positive disconfirmation). Consumers assimilated their liking for OC in the direction of expectations, as the difference actual vs. perceived liking was significant ($P < 0.001$). However the assimilation was not complete, as also the difference actual liking vs. expected liking was significant ($P < 0.001$). Consumers showed a willingness to pay OC (mean \pm SE = 4.20 \pm 0.13 €/100 g) higher than the local retail price for conventional (1.90 €/100 g) and even organic cheese (3.00 €/100 g). We conclude that the information about organic farming can be a major determinant of cheese liking and consumer willingness to pay, thus providing a potential tool for product differentiation, particularly for small scale and traditional farms.

Keywords: organic production, cheese liking, expectancy, information, willingness to pay.

Many different aspects of the product can be used by consumers to perform their food choices. Grunert et al. (2000) identified four main quality dimensions for dairy products: hedonic, health related, convenience and process related. Few of them can be experienced before purchase (search dimensions, e.g. colour), whereas most of them can be either experienced after purchase (experience dimensions, e.g. sensory properties), or never experienced (credence dimensions, e.g. healthiness, ethical aspects), which should be communicated to be perceived as they are credence characteristics that can not be confirmed either before or after purchase (Grunert et al. 2004). Therefore, consumers are forced to form expectations in order to perform their food choices. Both intrinsic (e.g. cheese holes, colour of external crust, etc.) and extrinsic cues (price, origin, production and nutritional information)

can be used to form expectations about product quality attributes. As visible characteristics (intrinsic cues) are not good indicators of product hedonic performances, consumers tend to rely on extrinsic cues such as information on the product (Banovic et al. 2009). In particular, ethical concerns, such as environmental pollution and animal welfare, are becoming increasingly important in the hierarchy of reasons to purchase products of animal origin. Although tangible aspects can markedly affect most purchasing decisions, independently from the knowledge and awareness of the consumer, intangible attributes are important for high-involvement consumers possessing enough beliefs and attitudes (McEachern & Schröder, 2002). For these consumers, such intangible attributes play a central role in defining product quality. Organic foods produced according to strictly defined standards are able to satisfy many of the expectations of contemporary consumers concerned with various aspects of food quality. Therefore, the provision of information about the benefits

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of organic farming on environment, animal welfare and health can increase consumer awareness and willingness to buy organic products.

According to a recent on-line survey (ACNielsen, 2005), organic alternatives are purchased mainly for health reasons. Therefore, there is a potential to increase consumer awareness of the environmental and animal benefits of organic foods by means of information (Zanoli et al. 2004). In addition, it has been observed that consumers are willing to access more information about organic food in order to make informed choices (Brennan et al. 2003).

Numerous studies have been conducted on the effect of information on food liking (Daillant & Issanchou, 1993; Aaron et al. 1994). Recently the effect of information about animal welfare on lamb (Napolitano et al. 2007a), beef (Napolitano et al. 2007b) and yogurt liking (Carlucci et al. 2009) has been studied, as well as the effect of information about organic production (Caporale & Monteleone, 2004; Kihlberg et al. 2005). All these experiments have shown that expectations induced by the information can affect the quality perception. Thus, if expectations are either positively (the liking score of the product tasted without external information is higher than expected) or negatively disconfirmed (the product is worse than expected), the assimilation model is generally applicable. According to this model, when external information is given hedonic ratings move towards the expectations and reach values different from those obtained tasting the same food without external information (Cardello & Sawyer, 1992). Conversely, in another study information about organic production did not affect the overall liking of pineapple (Poelman et al. 2008). However, these different results may be at least partly due to the fact that the consumers were told that differences between products could be subtle. Nevertheless, when consumers were grouped according to their attitudes, those with positive attitudes towards organic products showed higher likings.

The price that people are willing to pay is the major determinant of the market share of organic products. The general sense among consumers who would not buy organic is that they are usually more costly (ACNielsen, 2005). Meeting organic certification requirements usually implies higher production costs. For example, it is reported that the cost of producing organic beef in the United Kingdom is 20% higher than under conventional methods. However, for consumers from western countries, price is not the only determinant behind animal-food purchases as they are acquiring an increasing interest in farming practices and standards. Consumers do not seek the cheapest food but the best value for money, i.e. the maximum benefit for what they are prepared to spend (McInerney, 2004). Although intent to purchase depends upon the interactions of quality attributes (Brewer & McKeith, 1999), organic labelling has been found to be a more consistent effect compared with some sensory characteristics (such as appearance) on the price offered by consumers (Dransfield et al. 2005). However most of the researches were based

on questionnaires (Gil et al. 2000; Carpentier & Latouche, 2005) and purchase intent measurements may not be representative of the real behaviour of consumers. They may declare high preferences and purchase intent for products with high-perceived quality, albeit not buying them under economic constraints (Lange et al. 1999).

Recently, Napolitano et al. (2008) observed that, as for food liking, the assimilation model is also applicable to consumer willingness to pay (WTP) for dairy products. As a consequence, it can be hypothesized that information about the organic manufacturing process can increase both acceptability and WTP, thus providing a means to cover the extra production costs sustained by organic farmers.

Little is known about the effect of the information about organic production on the real consumer WTP for dairy products. Previous studies demonstrated that auctions are able to place consumers in real situations where they can show their true preferences. In particular, the Vickrey second price auction is widely used to assess consumer WTP for foods (Lange et al. 2002), and the value consumers give to food safety (e.g. Hayes et al. 1995), animal welfare (Napolitano et al. 2008) and fair trade (Rousu & Corrigan, 2008). According to this specific type of auction, consumers are individually asked to submit a sealed bid corresponding to the highest price they would agree to pay for a particular product. The highest bidder (i.e. the winner), by paying the second highest price, has the opportunity to buy a product at a price equal to or, more often, lower than the value he assigns to the product (Vickrey, 1961). People have an incentive to truthfully reveal their private preferences because the auction separates what they say from what they pay. By underbidding consumers can risk foregoing a profitable purchase, whereas by overbidding consumers can risk making an unprofitable purchase. Therefore, the Vickrey second price auction is considered incentive compatible, as the market price paid by a person is independent from what that person bids. More detailed information on the theory of incentive compatible auctions and experimental auctions in general can be found in Lusk & Shogren (2007).

The present study aimed to assess the effect of information about organic production on consumer liking for organic cheese and verify whether consumers display a WTP the extra costs associated with organic farming in a situation where a potential purchase performed by consumers is included.

Material and Methods

Products

Two types of Pecorino cheeses were produced by a commercial manufacturer using milk from Sardinian ewes: conventional (CC) and organic cheese (OC). Samples were offered to the subjects immediately after slice preparation in booths.

Table 1. Socio-demographic features of the subjects participating to the consumer test

	Levels	Number	Percentage
Age	20–39 years	42	28
	40–59 years	51	34
	>59	57	38
Sex	Female	85	56
	Male	65	44
Presence of children	Yes	51	34
	No	99	66
Education level	Primary school	8	5
	Secondary school	18	12
	High school	60	40
	Graduated	54	36
	Post-graduated	10	7

Subjects

Subjects were recruited in three different locations: Potenza (main city in the region Basilicata, southern Italy), Ancona (main city in the region Marche, central Italy) and Udine (main city in the region Friuli Venezia Giulia, northern Italy). The consumer panel consisted of fifty-one subjects for southern Italy, 49 subjects for central Italy and 50 subjects from northern Italy locations. They were recruited on the basis of age and level of education so that the sample resembled the actual Italian population.

In addition, subjects were selected using predetermined screening criteria based on consumption frequency of Pecorino cheese and organic products. One-hundred-ninety-three subjects were interviewed and were asked their frequency of consumption of Pecorino cheese at home (1=never; 2=once a year or less; 3=3–5 times a year; 4=less than once a month; 5=1–2 times a month; 6=more than twice a month; 7=at least once a week).

The selected consumer panel included subjects who reported consumption of Pecorino cheese at least "1–2 times a month" and organic products occasionally. As to organic products, consumers were distributed as follows: "once a year or less"=68, "3–5 times a year"=43, "less than once a month"=27, "1–2 times a month"=12. Subjects had a mean age of 50 years and were almost equally distributed for sex. The main features of the subjects participating to the consumer panel are depicted in Table 1.

Experimental design

The experiment was planned in four tests (Table 2). In the first test the consumers were offered both CC and OC in a balanced order of presentation. They were asked to taste the cheese and rate their liking in blind conditions, that is receiving no information on the products (Perceived liking). In the second test the subjects received two sheets with the information concerning the farming systems (conventional or organic). They were asked to read

carefully the information and give their liking expectation for that product (Expected liking). First and second tests were performed in the same day. The day after the third test was performed: the consumers were given OC only along with the information sheet. They were instructed to read the information before tasting the sample and express their liking score (Actual liking).

Hedonic data acquisition

Consumers rated their liking on a 9-point hedonic scale labelled at the left end with "extremely unpleasant", at the right end with "extremely pleasant" and at the central point with "neither pleasant nor unpleasant" (Kähkönen et al. 1996).

In tests 2 (expectations produced by information) and 3 (acceptability generated by information and tasting of the product) the following information concerning the farming systems was given to consumers:

- (1) Conventional cheese: *conventional sheep farming ensure standards of animal welfare as set by the current legislation; the administration of pharmaceuticals is allowed within the suspension limits, as well as the use of GMO and chemicals for the production of animal feeds, in accordance with the current legislation; a high stocking density per hectare is allowed.*
- (2) Organic cheese: *organic sheep farming practices ensure standards of animal welfare higher than those set by the current legislation by promoting grazing systems and the expression of species-specific natural behaviour; the use of pharmaceuticals is markedly reduced; the use of GMO and chemicals for the production of animal feeds is banned; stocking density per hectare is low in order to reduce the impact of farming on the environment.*

A test was conducted on 31 subjects who were not involved in the experiment in order to validate such information and verify whether consumers specifically responded to the fact that the cheese was organic rather than to positive messages in general. They were asked to read each piece of information concerning organic farming (animal welfare, product safety and environmental pollution) either separately on three different information sheets or together on one sheet (only in this latter case consumers were told that the product was actually organic) and score their liking expectations. The four information sheets were randomly offered to consumers.

Vickrey auction

The second price Vickrey auction (Vickrey, 1961) was used to assess consumer WTP organic cheese. Participants attended a short presentation explaining the procedure to be followed for the auction. It was made clear that the submission of bids implied a commitment to buy the product. Participants agreeing to the procedure signed a

Table 2. Summary of the experimental design for the assessment of cheese liking (L) and consumer willingness to pay (WTP)

Test	Day	Stimulus presentation	Type of evaluation	Type of rating
1	1	Cheese	Tasting without information	Perceived L
2	1	Information	Expectation	Expected L
3	2	Cheese+information	Tasting with information	Actual L
4	2	Product display	Auction	WTP

Table 3. Rating (\pm SE) given by the consumer panel during the three hedonic tests

Type of rating	Organic cheese	Conventional cheese
Perceived liking	6.9 \pm 0.11	7.01 \pm 0.09
Expected liking	7.69 \pm 0.08a	6.09 \pm 0.12b
Actual liking	7.42 \pm 0.07	NR
P-E	-0.88***	0.99***
	Negative disconfirmation ¹	Positive disconfirmation ²
A-P	0.61***	—
	Assimilation ³	
A-E	-0.27***	—
	Incomplete ⁴	

P=perceived liking mean scores (baseline); E=expected liking mean scores; A=actual liking mean scores (with information); NR=not recorded

^{a,b} = $P < 0.001$; *** = $P < 0.001$

¹ The product is worse than expected

² The product is better than expected

³ Actual liking moves towards the expectations

⁴ Although assimilation occurs, actual liking is lower than expectations

consent form and received 10 Euro in cash. Subsequently, a formal training on the use of the Vickrey second price auction was conducted. It was explained that the maximum price accepted to pay for 100 g of organic cheese had to be written on paper, separately by each participant. The participant submitting the highest price (winner) had to buy the product, not at the submitted price, but at the second highest price (i.e. the second highest submitted bid). In case of more consumers offering the same highest bid only one participant, randomly chosen by another consumer, would be selected as winner. This procedure allowed one of the participants to buy organic cheese at a price lower than or equal to the price they would normally accept to pay. It was also explained that the study aimed to know the value that the product had for the consumers and that the best option for them was the submission of their real reservation price. In order to ascertain that all participants correctly interpreted the procedure, some practice was conducted using snacks. Subsequently, an auction was conducted where consumers submitted bids after the display of a 100 g slice of organic Pecorino cheese.

Statistical analysis

Data were subjected to analysis of variance with geographical location, age, sex, presence of children under

the age of six and level of education as factors. The Student's paired t-tests were used to evaluate differences between mean scores either obtained for the two products (OC and CC), or obtained for the same product under different conditions (tasting only, information only, tasting with information). The relationship between OC hedonic data and WTP OC was computed using the Spearman coefficient of correlation.

Data gathered for the validation of information were subjected to analysis of variance with one factor (type of information).

Results and Discussion

Validation of information

Data from the test of validation showed that the type of information significantly affected the expected liking ($P < 0.01$). Expectations generated by the complete information (animal welfare+product safety+environmental pollution) on the organic production system were higher than those elicited by the information on animal welfare ($P < 0.05$) or environmental pollution only ($P < 0.01$), and tended to be higher than the expectations produced by the information on food safety ($P < 0.15$). Conversely, no differences were observed between the expectations generated by the three different pieces of information. Therefore, consumers specifically responded to the fact that the cheese was organic rather than to positive messages in general. In a recent study on WTP for milk, American consumers were willing to pay more for recombinant bovine somatotrophine-free milk and milk from cows not treated with antibiotics. Conversely, the combined premium for these attributes was not different from the WTP for the completely organic product, which included the use of animal welfare friendly farming techniques (Bernard & Bernard, 2009). Accordingly, in a study based on focus groups, Resurreccion (2004) observed that healthiness was the most important food quality attribute for USA consumers.

Comparison between products

Ratings given by consumers to OC and CC are summarised in Table 3. Consumers rated both products at scores well above the central point (5=neither pleasant nor unpleasant) for perceived liking. These results indicate that the Pecorino cheese from both organically and conventionally reared sheep was characterised by a good

eating quality. Mean scores of perceived liking were similar for OC and CC ($P > 0.05$). Previous studies showed the effect of organic farming on meat quality (see Braghieri & Napolitano, 2009 for a review), whereas no information is available about the effect on cheese acceptability. In this study organic farming practices did not change product acceptability, possibly because in sheep organic and conventional farming practices are not much different and both are based on the use of pasture. In addition, previous research showed that processing parameters are the most important in affecting the eating quality of the resultant cheese (Beuquier et al. 1997). Therefore, the use of the same processing techniques may have reduced differences between products.

Both expected liking scores were above the central point. A high expected liking for conventional cheese is likely to be due to a satisfactory consumer trust in legislation transparency and processing methods. However, expected liking scores were higher for OC than for CC ($P < 0.001$). Previous researches suggest that the positive consumer responses in our study may be related to consumer expectations that organic food is safer, healthier and high quality (Brennan et al. 2003; Michaelidou & Hassan, 2008).

Comparison between different information conditions

Results concerning the effect of information on expected and actual liking of cheese are shown in Table 3. For OC the expected acceptability was significantly different from the perceived liking expressed in blind conditions ($P < 0.001$), thus indicating that a disconfirmation occurred. In particular, the consumers found OC worse than expected (negative disconfirmation). These results do not indicate that the product had a poor eating quality (in blind conditions organic cheese was rated above the central point), rather they demonstrated that information about farming practice can have a marked impact on consumer expectancy with organic standards associated with high expected product quality. Accordingly, previous studies revealed a marked effect of positive information about farming practices and animal welfare on actual liking of meat (Napolitano et al. 2007a,b) and WTP for yogurt (Napolitano et al. 2008). CC was considered better than expected (positive disconfirmation), as a significant difference was observed between expected and perceived liking expressed in blind conditions ($P > 0.001$). In this case, although the expected liking was above the central point, it was lower than perceived liking.

A significant difference between perceived and actual liking was observed for OC, as the former was lower than the latter ($P < 0.001$). Therefore, the information given about organic farming was able to affect the actual liking of cheese. The effect of information can be explained on the basis of the assimilation model, which can be observed when the actual liking of the product moves in the direction of the expectations. This effect is likely to be due to

the important role played by the information in the determination of actual liking of organic cheese. This information is able to address some of the main current consumer concerns, such as product safety, animal welfare and environmental pollution. In addition, the assimilation was possibly facilitated by the good eating quality of the organic product, as indicated by the high value of perceived liking observed in blind conditions. In fact, Moskowitz (1995) showed that it is not sufficient to state that a product has high quality standards to motivate consumers and information should be supported by real benefits and adequate sensory properties. Accordingly, it has been demonstrated that, although the increased consumer WTP for the organic labels is mainly linked to ethical concerns, the positive effect of this information may also be dependent on the intrinsic characteristics and perceived quality of the product (Tagbata & Sirieix, 2008).

Consumers did not completely assimilate their liking for OC in the direction of expectations, as indicated by the fact that expectancy was significantly different from actual liking ($P < 0.001$), which in turn showed scores above 7 (pleasant). The incomplete assimilation observed for this product is likely to be due to the important role played by the sensory properties of cheese in the determination of actual liking, as perceived liking, albeit above the central point, was lower than expectancy.

Comparison between consumers with different demographic features

No significant effects of location, sex, age and level of education were observed on both hedonic data and consumer WTP. Huffman et al. (2003) also found that most socio-demographic attributes of the participants, such as gender, education and household income did not change consumer WTP for genetically modified foods. Actual liking for OC were influenced by the presence of children with higher values expressed by consumers with children below the age of six compared with consumer without children of the same age (7.82 ± 0.21 vs. 7.38 ± 0.09 , respectively; $P < 0.05$). The same trend was observed for assimilation (1.25 ± 0.35 vs. 0.56 ± 0.14 for consumers with and without children below the age of six, respectively; $P < 0.05$). Previous data suggest that the responsibility taken for feeding children may explain these differences, as people may be more concerned about what their children eat than what they eat themselves (Tregear et al. 1994; Latacz-Lohmann & Foster, 1997). Therefore, the presence of children may have induced a higher involvement in ethical issues and sensitivity to the positive information related to the organic production system.

Consumer WTP and its relationship with organic cheese liking

Although hedonic test and Vickrey auction are different in terms of rating scale, training and influence of the

behaviour of a consumer on the behaviour of the others, previous studies showed that WTP is highly correlated with food liking, thus indicating that both approaches are appropriate for consumer studies (Lange et al. 2002; Carlucci et al. 2009). In those studies, consumer WTP reflected the hedonic behaviour, thus validating the auction procedure for food perception evaluation purposes. In this study, after the effect of information on food value as perceived by consumers was verified in terms of liking, a monetary quantification of that value was performed by means of the auction. Consumers expressed a WTP for OC (mean \pm SE = 4.20 \pm 0.13 €/100 g) higher than the local retail price for conventional (1.90 €/100 g) and even organic cheese (3.00 €/100 g).

Food differentiation can be based on both product or process characteristics. For animal-based products, process characteristics may be represented by the farming practices and the related organic standards. As the main limit to purchasing organic products remains price, due to high production costs, which are affected by organic rules (higher space allowance, origin of feedstuffs, etc.) and small-scale production systems, one strategy to overcome this problem may be the induction of increased WTP by constant and reliable quality signalling systems capable of providing an ethical value to the product, which may become even higher if associated to traditional farming systems and typical cheese productions.

Consumer WTP for OC was significantly correlated with expected and actual liking ($P < 0.01$), whereas OC perceived liking was not significantly correlated to WTP ($P > 0.05$). These results suggest that WTP is more dependent on information than on product sensory properties. Accordingly, Grunert et al. (2004) noted that consumers tend to increasingly rely on extrinsic cues, such as information, than intrinsic cues, i.e. sensory characteristics, to make purchase decisions. Tagbata & Sirieix (2008) identified three clusters of consumers: those insensitive to the label "organic and fair trade product", those positively affected by the label and those positively affected by the label if the taste of the product was good.

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