

**Marietta Kiss<sup>1</sup>, Enikő Kontor<sup>1</sup>, András István Kun<sup>2</sup>**

<sup>1</sup>*Institute of Marketing and Commerce, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary*

<sup>2</sup>*Institute of Leadership and Management Sciences, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary*

[kiss.marietta@econ.unideb.hu](mailto:kiss.marietta@econ.unideb.hu)

[kontor.eniko@econ.unideb.hu](mailto:kontor.eniko@econ.unideb.hu)

[kun.andras@econ.unideb.hu](mailto:kun.andras@econ.unideb.hu)

**Abstract:** *One of the most important success factors in the organic food industry is the positive image that a significant number of customers attach to organic products in many countries, which includes the perception of healthiness and also sensory characteristics such as smell, texture or taste. Several papers have examined the effect of organic certification on consumer perceptions for many types of products from a number of perspectives. The present study aims to reveal the effect of organic ('bio') labels on customers' evaluation of chocolates regarding five product attributes: fragrance, taste, healthiness, calorie content and price. The two research questions are: (1) 'How do consumers modify their perceptions about a given chocolate after receiving information as to whether the given chocolate is an organic or a non-organic product?' and (2) 'How do consumers' evaluations of organic and non-organic chocolates relative to each other change after it is revealed which ones have an organic certificate?' To find the answers an experiment was conducted on a sample of 32 second year bachelor university students from the 'Commerce and Marketing' major. During the experiment the students tasted 4 dark (2 regular and 2 organic) and 3 milk (2 regular and 1 organic) chocolates in two phases. In the first phase they had no information as to whether organic products were involved in the experiment, but in the second the organic products were labelled. The students had to evaluate fragrance, taste, healthiness, and calorie content, and estimate the price in both phases. The results show that 'organic' labels can significantly modify consumers' perception and evaluation of chocolates with every attribute for one or more of the chocolates. Labelling can also widen the perceived gap between organic and regular chocolates according to fragrance, healthiness, calorie content and price. However, changes were identified only in the case of healthiness and price. Both were absolutely and relatively evaluated as higher for organic products after labelling.*

**Keywords:** organic food; chocolate; food marketing; imperfect information

**JEL classification:** M31; D83

## 1. Introduction

In a saturated food market, the consumption of organic products has grown considerably in many European countries, and they have gained a considerable market share (Canavari and Olson in Hemmerling et al., 2013:58). A major factor in this successful development of the organic food industry is the positive image that many consumers attribute to organic products. This includes both health benefits and sensory characteristics such as smell, taste, or appearance (Idda, Madau and Paulina, 2008; Hamm and Gronefeld in Hemmerling et al., 2013:58). In the case of organic products, there are a number of studies that deal with factors influencing (non-sensory) perceived product quality (Schifferstein and Oude Ophuis, 1998; Hughner et al., 2007; Zanolini and Naspetti, 2002). However, the

majority of the studies provide evidence about the consumers' stated or expected perception of quality.

In our research we aimed to simulate a situation in which a customer chooses between different types of treats at a given price level. With the general assumption in economics that market price evolves as the equilibrium between the forces of supply and demand, we can also state that prices reflect the overall utility a good provides to the customer. Our question is: how much of this utility derives from the 'objective' features of a chocolate (sensory characteristics: taste, smell, texture; and non-sensory characteristics: calorie content, healthiness, price) and how much of it can be explained directly by the information (via the organic certification) indicating that the manufacturer has followed the requirements of controlled ecological (organic) farming methods.

We selected chocolate because it is a product which is well-known and frequently bought by Hungarians. In addition, chocolate as a good provides an interesting study of the role of labels since it is often considered to be a luxury or a special treat. Moreover, health arguments in favour of organic consumption are less likely to hold when considering chocolate (Rousseau, 2015).

## **2. Literature Review**

A product label is a quality signal for the customer, therefore the organic food label is an important tool in helping customers identify organic products. Without an organic label, the consumer might not be aware that the product is organic because the differentiation between conventional and organic food may not be that discernable (Van Loo et al., 2011). At the same time, several research studies (e.g. Janssen and Hamm, 2012; Szakály et al., 2014; Rousseau, 2015) have shown that knowledge of organic labels is very low.

Brunso, Fjord and Grunert (2002), and Zanolli and Naspetti (2002) showed that consumers relate organic food to perceived good quality. Although the traditional food quality attributes, including sensory attributes such as taste and smell are important for most consumers, the non-sensory attributes such as calorie content, a lack of additives and residues or the process in which the product was produced are becoming increasingly significant (Wilkins and Hillers, 1994).

Several studies have found 'taste' to be among the most important criteria in organic food purchases (see among others Lusk and Briggerman, 2009). According to Rousseau (2015), chocolate consumption is all about taste, since four of the five highest ranked aspects when buying chocolate are related to sensory experiences. According to Hughner et al. (2007), Shuldt and Schwarz (2010), Westcombe and Wardle (1997) and Bauer et al. (2013) consumers of organic food do perceive taste advantages over conventional alternatives. Naspetti and Zanolli (2014) showed that both regular and occasional organic food shoppers tend to feel organic products are tastier than conventional ones. The research by Szente (2005) conducted among Hungarian consumers arrived at a similar conclusion. There is a strong significant relationship between the purchase of organic foods and the evaluation of taste. According to people who consume organic foods regularly, these products are tastier than the conventional ones. Those not consuming organic products thought some foods (goat cheese, vegetables) very tasty, while others (sweets, bread) disappointed them (Szente, 2005). This phenomenon has also been supported by several other studies. Lee et al. (2013), examined consumer evaluations of yoghurt among American consumers, while Hemmerling et al. (2013), did the same for the citizens of six European countries, and they both concluded that consumers thought that the yoghurt with an organic label tasted better than the one without a label; however, in a blind test they liked the conventional product better. Rousseau (2015) examined the evaluation of organic and conventional chocolates' attributes via a blind test and concluded that the majority of the respondents preferred the taste of conventional

chocolate over that of labelled chocolate (some 50-70%); still, there was a sizeable group of respondents who were undecided between both types of chocolate, or who even preferred the taste of labelled chocolate. However, the global claim 'organic food tastes better' is not valid for all organic food categories. Fillion and Arazi (2002), conducting a sensory test of orange juices did not find significant differences between organic and conventionally labelled products. Moreover, in the research of Lee et al. (2013) consumers preferred the taste of conventional cookies over organic ones after they realised they were not organic. These results suggest that the effect of organic labels on perceived taste may be different for different product categories and countries (Hemmerling et al., 2013).

The overwhelming majority of studies find 'health' to be the primary reason consumers buy organic foods (Hughner et al., 2007; Zagata, 2012; Rousseau and Vranken, 2013). A series of research studies (Schifferstein and Oude Ophuis, 1998; Brécard et al., 2008; Mondelaers et al., 2009; Lee et al., 2013; Bauer et al., 2013) revealed that the central benefit of organic foods for consumers is that they believe in their outstanding healthiness compared to conventional foods. Even for a not particularly healthy product such as chocolate, a sizeable portion of consumers still associate an organic product with a less negative health impact compared to a conventional product (Rousseau, 2015). When the product is defined as originating from 'organic farming' this fact influences the perception of other brand characteristics (in this case sensory characteristics, e.g. taste, and non-sensory characteristics, e.g. healthiness) which can be explained by cognitive psychology as a manifestation of the halo effect. However, Wansinck (1994) established that there is a misconception among consumers that healthy foods have a bad taste, and unhealthy foods have a good taste. Raghunathan, Naylor and Hoyer (2006) refer to this phenomenon as the 'unhealthy=tasty' intuition. Thus people believe an unhealthy food is inherently tastier, from which it follows that they perceive healthy products as less tasty (Wilkins and Hillers, 1994). Research studies by Schuldt and Schwarz (2010), and Westcombe and Wardle (1997) also show that although products with an organic label were thought healthier, consumers judged them less tasty.

Some studies have found that consumers believe organic food to be more nutritious (Hill and Lynchehaun, 2002; Bauer et al., 2013). It is worth noting that there has been no conclusive evidence for this (Hughner et al., 2007). Based on the examination of three products (cookies, potato chips, and yoghurt) Lee et al. (2013) stated that consumers assumed products with organic labels have a lower calorie content than regular products. Schuldt and Schwarz (2010), analysing consumers' evaluation of cookies with and without organic labels drew the same conclusion.

According to the majority of consumers – especially those not consuming organic foods –, organic products are more expensive than conventional ones (Naspetti and Zanolini, 2014; Rousseau, 2015). The high price premiums associated with organically produced food result in ambiguous consumer signals. While consumers indicate the high price of organic food to be prohibitive in their purchasing behaviours, they use price to form opinions about the quality and taste of organic food items. Several research studies have found that consumers are willing – at least hypothetically – to pay a premium for organically grown food (see among others Lee et al., 2003; Rousseau and Vranken, 2013; Bauer et al., 2013; Janssen and Hamm, 2012); however, their real behaviour shows a reduced willingness to pay a premium (Krystallis and Chryssochoidis, 2005), and many are not willing to pay as much as the current market price premiums (Millock et al., 2002). Tagbaka and Sirieix (2008) found that consumers are willing to pay as much as a 78.5% price premium for organic dark chocolates, however, Rousseau (2015) found a contradictory result that consumers in Flanders have a negative willingness to pay a premium for organic chocolates.

### 3. Method and Sample

In the experiment we intended to use bio and non-bio labelled chocolates (in this paper we use 'bio', 'ecologically produced' or 'organic' as synonyms) within a comparable price-range (we selected products with standard non-promotional prices). Although in the English language food marketing literature the term 'organic' is used (Janssen and Hamm, 2012), in this paper we use the term 'bio' referring to the labelling of organic products because in Hungary products indicate their organic origin with this term.

The characteristics of the chocolates we used in our research are presented in Table 1. Every item was bought on the same day (17 January 2015) in varied shops. Table 1 also shows what coded labels were used during the tasting. The tasters were divided into two different groups. One of them was given red-labelled tasting samples, the other were provided with black-labelled samples. Red- and black-labelled samples contained the same chocolates, but in reverse order, to avoid the rank order effect during the experiment.

**Table 1: Characteristics of the chocolate bars used in the tasting**

Brand	Vivani	Bonbonetti	Alnatura	Wawel	Stühmer	Alnatura	Wawel
Type	Dark	Dark	Dark	Dark	Milk	Milk	Milk
Category	Bio	Not bio	Bio	Not bio	Not bio	Bio	Not bio
Price (HUF)	599	499	599	579	543	599	579
Cocoa %	71	70	70	70	33	33	36
Expiry (m/y)	05/2016	11/2015	11/2016	03/2016	02/2016	04/2016	01/2016
Red label	A	B	C	D	E	F	G
Black label	D	C	B	A	G	F	E

Note: bio means that the chocolate is certified as an organic product.

The tasting event was arranged on 26 March 2015. The data collection was conducted in two phases and four rounds, as follows:

First phase:

- Tasting of 4 dark chocolates. No information provided about involvement of organic products.
- Tasting of 3 milk chocolates. No information provided about involvement of organic products.

Second phase:

- Tasting of 4 dark chocolates again. The organic products were labelled and announced.
- Tasting of 3 milk chocolates again. The organic product was labelled and announced.

During the tasting process the participants were supplied with about 1 to 2 grams of each chocolate in the actual round. Non-sparkling mineral water was also provided. The participants were informed that the order and even the types of the chocolates had been changed between the phases (however, this was not true).

On the evaluation sheet we used a semantic differential scale for the evaluation of sensory, health and calorie characteristics. The respondents had to mark the given chocolate's place along five dimensions graphically represented by 7 centimetre long sections. The dimensions and the two opposite endpoints of the sections were the following (in this order):

Fragrance: bad smell – good fragrance  
Taste: bad taste – good taste  
Texture: bad texture – good texture  
Healthiness: not healthy – healthy  
Calorie: low calorie – high calorie

During the data recording we used the millimetre distance from the left-side endpoint of the section between 0 and 70. A higher value always means a higher quality in the first four dimensions and higher (perceived) calorie content in the fifth.

The total sample of the respondents included 32 second year students from the 'Consumer Behaviour' course on the 'Commerce and Marketing' bachelor level major of the University of Debrecen. The total headcount of the course is 67, thus the participation rate is 47.7%. A strong self-selection effect must be taken into consideration, because it was the students' decision whether or not to take part in the research. However, they were motivated by the offer of an extra 5% for the final grade of the Consumer Behaviour course. The evaluation sheets were anonymous, but sex and year of birth were asked. 10 male and 22 female students participated, with the following birth years (number of students in brackets): 1988 (1), 1990 (1), 1991 (2), 1992 (4), 1993 (10), 1994 (11), 1995 (3).

Our samples, both of the chocolates and of the respondents, were selected according to availability (convenience sample) and thus do not make it possible for us to draw general conclusions on the absolute and relative consumer evaluation of organically produced chocolates. However, these samples are more than sufficient to seek answers for the following research questions:

*Q1: How do consumers modify their perception about a given chocolate after receiving information as to whether the given chocolate is an organic or a non-organic product?*

*Q2: How do consumer evaluations of organic and non-organic chocolates relative to each other change after it is revealed which ones have an organic certificate?*

In other words, we can identify and analyse the perception-biasing effect of bio labels, if it exists. However, the sequential nature of the applied tasting procedure should be taken into consideration: it is possible that some of the tasters become full (saturation effect) or the previously tasted flavours can distort their sensing ability for the later rounds.

#### 4. Results

In the first step of the analysis we calculated the descriptive statistics for each chocolate in both phases (see Table 2). In the second step – to answer the first research question (Q1) –, we compared the means of each chocolate with a paired samples *t*-test for all the 5 dimensions to identify differences that are statistically significant. The test outcomes are presented in Table 3. In the case of organic products, revealing the organic qualification seems to modify the fragrance (in a positive direction) only for Vivani. The taste increased for Vivani (bio) and Alnatura Milk (bio), but decreased for Alnatura Dark (bio). There were no significant changes in texture evaluations. Supporting the previous findings of the literature, for all the three organic products the bio label enhanced the perceived healthiness. Calorie content was estimated to be lowered only for Alnatura Dark (bio). Respondents assigned a higher price to all the three organic products at a significance level of at least at 10% after receiving the information that they are certified as organic food, but in the case of Vivani (bio) and Alnatura Milk (bio), this effect was significant at the 1% level.

Information about not being an organic product seems to positively modify the smell perception of Wawel Dark but negatively that of Wawel Milk. Taste and texture evaluations moved downwards for Bonbonetti, but did not change for other products. Healthiness estimations did not modify significantly for any of the non-organic chocolates. Stühmer was estimated to have a higher calorie content and to be more expensive in the second phase (both significant only at 10%). Thus the only consequent effects of informing the respondents of a chocolate's organic or non-organic origin were the increased healthiness perception and the higher estimated prices of organic products.

**Table 2: Descriptive statistics of the the brands**

Brand	Vivani		Bonbonetti		Alnatura		Wawel		Stühmer		Alnatura		Wawel	
Type	Dark		Dark		Dark		Dark		Milk		Milk		Milk	
Category	Bio		Not bio		Bio		Not bio		Not bio		Bio		Not bio	
Phase	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
<b>Fragrance</b>														
Mean	38	27	36	37	34	33	30	39	37	36	35	37	40	31
S.D.	20	17	18	17	19	17	19	17	16	14	16	15	15	16
N	31	32	31	31	32	32	32	32	32	32	32	32	32	32
<b>Taste</b>														
Mean	14	21	37	29	35	26	36	36	44	44	39	47	28	27
S.D.	15	19	20	18	17	18	20	17	16	17	18	18	19	20
N	31	32	31	31	31	32	32	32	32	32	32	32	32	32
<b>Texture</b>														
Mean	26	24	43	30	38	32	40	38	46	46	44	46	32	32
S.D.	21	20	18	20	20	18	20	19	12	16	16	17	19	21
N	31	32	31	32	32	32	32	32	32	32	32	32	32	32
<b>Healthiness</b>														
Mean	30	42	34	36	35	44	40	42	30	33	29	43	25	29
S.D.	22	19	16	16	15	15	19	15	14	15	13	15	16	18

<b>N</b>	31	32	31	32	32	32	32	32	32	32	32	32	32	32
<b>Calorie</b>														
<b>Mean</b>	29	30	37	39	35	28	36	36	42	46	42	40	38	35
<b>S.D.</b>	21	18	14	16	13	15	16	14	14	13	12	16	17	18
<b>N</b>	31	31	31	31	32	31	32	31	32	32	32	32	32	32
<b>Estimated price</b>														
<b>Mean</b>	29 2	41 8	349	311	34 4	39 5	35 9	35 5	31 7	34 5	30 5	41 0	26 8	27 1
<b>S.D.</b>	31 2	40 9	414	154	35 4	40 3	35 7	37 1	35 0	35 4	40 4	37 4	35 9	16 2
<b>N</b>	31	32	31	32	32	32	32	32	32	31	32	32	32	32

Notes: *N* is the sample size, S.D. is the standard deviation

**Table 3: Results of the paired samples *t*-test to identify changes after receiving 'bio' information**

<b>Brand</b>	<b>Vivani</b>	<b>Bonbonet ti</b>	<b>Alnatur a</b>	<b>Wawe l</b>	<b>Stühme r</b>	<b>Alnatur a</b>	<b>Wawe l</b>
<b>Type</b>	Dark	Dark	Dark	Dark	Milk	Milk	Milk
<b>Category</b>	Bio	Not bio	Bio	Not bio	Not bio	Bio	Not bio
<b>Fragrance</b>	2.655**	-0.037	0.406	- 2.160*	0.302	-0.435	3.928**
<b>Taste</b>	- 2.200**	2.324**	2.723**	-0.063	-0.115	-2.371**	0.540
<b>Texture</b>	0.475	4.098***	1.504	0.700	-0.011	-0.378	0.034
<b>Healthines s</b>	- 3.589**	-0.249	-2.870***	-0.845	-0.962	-4.644***	-1.395
<b>Calorie</b>	-0.254	-0.719	2.272**	0.251	-1.814*	0.473	1.360
<b>Estimated price</b>	- 3.947**	0.683	-1.778*	0.198	-1.973*	-3.781***	-0.083

Note: *t*-statistics are presented in the cells. \*\*\* 1% significant, \*\* 5% significant, \* 10% significant

The second research question (Q2) addresses the separating effect of bio labels: whether the perceived gap between organic and conventional products becomes more identifiable after organic chocolates are labelled than before. Even if providing information on a chocolate's bio or non-bio category did not modify consumers' perceptions of product attributes significantly, it is still possible that the accumulated changes of the bio and on the non-bio product categories – which are individually non-significant – can reach a significant size. Table 4 contains data from paired samples *t*-tests between bio and non-bio chocolate categories for both phases. Values for the categories were computed as unweighted means of the individual values of products belonging to the given category. In the first phase – according to the *t*-tests –, we can reject the equivalence of organic and non-organic chocolates in 3 cases at the 1% significance level, in 2 cases at the 5% level and in 1 case at the 10% level. In the second phase we have found the two categories significantly different at the 1% level in 10 cases, at the 5% level in 2, and at the 10% level in 2 cases. Hence, there are more significant differences between the two product groups in the second phase than in the first phase; therefore we can conclude that bio-labelling has a separating effect among chocolates.

If the organic chocolates are labelled, it became significant at 1% that – according to the participants – a price gap exists between regular and organic chocolates (the latter tend to be perceived more expensive). Organic chocolates also became relatively healthier, according to the respondents, if they are labelled (the significance level is 10% for the dark and 1% for the milk chocolates). A positive taste difference became significant for the organic chocolates only in the case of milk chocolate bars (the significance is 1%). Texture differences did not change between phase 1 and phase 2. After labelling the organic chocolates, calorie content and fragrance differences became significant for dark chocolates (the significance is 1%). The perceived calorie content became relatively lower (this is also true for the total sample at the 1% level) and the perceived smell became relatively worse (the significance is 10% for the total sample) for the organic chocolates.

**Table 4: Paired samples t-tests to identify differences between bio and normal chocolates**

	Phase 1: bio labels not provided			Phase 2: bio labels provided		
Brand	Dark	Milk	Total	Dark	Milk	Total
<b>Fragrance</b>						
Mean	-3.435	3.109	-0.089	7.661	-3.328	3.132
S.D.	20.077	17.455	11.103	14.947	14.835	10.122
t	-0.953	1.008	-0.044	2.854 <sup>***</sup>	1.269	1.723
<b>Taste</b>						
Mean	11.467	-3.234	6.214	8.548	-11.516	2.145
S.D.	14.672	16.707	11.690	13.264	20.151	10.969
t	4.281 <sup>***</sup>	-1.095	2.912 <sup>***</sup>	3.588 <sup>***</sup>	-3.233 <sup>***</sup>	1.089
<b>Texture</b>						
Mean	9.242	-5.531	3.653	5.750	-6.781	2.380
S.D.	11.076	14.319	9.848	13.986	15.364	9.726
t	4.646 <sup>***</sup>	-2.185 <sup>**</sup>	2.065 <sup>**</sup>	2.326 <sup>**</sup>	-2.497 <sup>**</sup>	1.384
<b>Healthiness</b>						
Mean	3.887	-0.906	0.801	-3.922	-11.813	-7.901
S.D.	17.994	8.943	11.676	12.460	16.663	10.801
t	1.203	-0.573	0.382	-1.780 <sup>*</sup>	-4.010 <sup>***</sup>	-4.138 <sup>***</sup>
<b>Calorie</b>						
Mean	4.742	-2.219	2.882	8.903	-0.078	6.304
S.D.	15.672	11.244	11.432	12.079	17.017	11.738
t	1.685	-1.116	1.403	4.104 <sup>***</sup>	-0.026	2.990 <sup>**</sup>
<b>Estimated price</b>						
Mean	34.855	-12.813	9.460	-73.688	-104.758	-87.858
S.D.	97.116	76.540	55.985	172.652	169.037	156.885
t	1.998	-0.947	0.941	-2.414 <sup>***</sup>	-3.451 <sup>***</sup>	-3.118 <sup>**</sup>

Note: Mean is the difference between the mean of the non-bio labelled chocolates and the mean of the bio labelled chocolates.

## 5. Conclusion

In our research we aimed to answer how the perception of a product's (in this case chocolate's) characteristics is modified by the information that the product is organic or conventional. According to the literature, products with an 'organic' label have a positive image that is transferred to the sensory (e.g. taste, smell, texture) and non-sensory (e.g. calorie content, healthiness) attributes as well.

Our empirical findings support the idea that bio labels can modify consumers' perceptions in the case of chocolates, in multiple dimensions (fragrance, taste, texture, healthiness,



calorie, estimated price). We also conclude that these labels can create a larger perceived gap between organic and conventional products, even in dimensions where differences were not identified before the introduction of bio labels (fragrance, healthiness, calorie content). However, only in the dimensions of estimated price and perceived healthiness were the results consequent: in these cases, the labels positively modify the perceptions of organic chocolates, both absolutely and relatively.

One of the limitations of our research is that the examination covers only one type of product (chocolate), thus it would be worth expanding it to further products in the future. Besides this, the sample was small in size, and the relatively homogeneous demographic characteristics of the participants (about 20-22 year old university students) might influence their attitudes towards, and knowledge about, organic foods. We also did not examine whether the frequency of organic food consumption influences our results.

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