

ORGANIC/BIO FOOD LABELLING SYSTEMS AND THEIR PERCEPTION BY CZECH CONSUMERS WITH A FOCUS ON ECOLOGY

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ABSTRACT

The importance of organic products in the Czech Republic as an EU member state is growing. Among other things, increasing the share of organic products in relation to conventional products is one of the long-term objectives of the European Community. The research carried out focused on examining differences in consumer purchasing behaviour, specifically the associations that consumers most often associate with brands that label bio/organic products in the Czech Republic. Using various statistical methods, the knowledge and perception of organic/bio products labelled with the Czech and European logos was investigated. The research shows that consumers most often associate products bearing the Czech label with ecology and environmental friendliness. Respondents often associate this labelling with higher quality and at the same time subjectively perceive the food as healthier. The European organic food label is most often associated with ecology and environmental friendliness, higher quality and perceived as healthier by respondents. Respondents show significantly higher ignorance of this label than the national label.

KEY WORDS

sustainable food and agriculture, ecological consumer behaviour, ecological products, organic/BIO products, Czech and European organic/BIO labels, sustainable environment

JEL CODES

C12, C30, C35, C83, M31

1 INTRODUCTION

Increasing the share of organic products in relation to conventional products, including the promotion of their production in the field of organic farming and food processing, is one of the long-term objectives of the European

Community. Therefore, the importance of organic products on the European market is very topical and the market for organic products in the European Union has been growing continuously for several decades, with the largest

growth period experienced by this sector in 1997–2006, when the increase in the volume of organic food produced was 80% (Ditschun, 2010). The United States of America has the dominant share of the global market for organic streams (42%), followed by Germany (11%) and France in third place (9%), see Statista (2021), Lockeretz (2011), Lockie et al. (2002). Thus, Europe profiles as the second largest market for organic products in the world (Kristiansen et al., 2006; Willer et al., 2021).

The market for organic products is also on the rise in the Czech Republic, with the total market volume of these organic products in the Czech Republic exceeding CZK 4 billion in 2016 (Institute of Agricultural Economics and Information, 2021; Janssen and Hamm, 2012). The total consumption of organic products by consumers in the Czech Republic was then CZK 2.55 billion. In the same year, for example, there were 50% more producers of organic products in the Czech Republic than in 2009 (Czech Union of Commerce and Tourism, 2021). In 2019, the total consumption of bio-products among consumers was CZK 3.73 billion (Czech Ministry of Agriculture, 2019). The most popular bio-products among Czech consumers are milk and dairy products and fruit and vegetables, with processed foods such as coffee, tea, spices, and baby food and feeds coming in third place (Czech Union of Commerce and Tourism, 2021).

In terms of consumption behaviour in relation to organic products, Kareklas et al. (2014) or Yadav (2016) identify two main reasons for purchasing products labelled organic/BIO. The first reason for purchasing food labelled in this way is primarily organic. The second main reason is to purchase these products because of subjectively perceived higher quality and potential health benefits (Dimitri and Dettmann, 2012).

One of the primary indicators of subjective quality of products is the labelling system, which provides consumers with critical information about the products they purchase (Martini and Menozzi, 2021; Aschemann-Witzel and Zielke, 2017). To assist consumers in making informed decisions, policymakers worldwide have implemented various strategies, including food

quality schemes, quality labelling (Jürkenbeck, 2023; Padel and Foster, 2005), and origin labelling (Garnier and Bilen, 2025; Grunert, 2005), as well as food systems focused on sustainability (Bauer et al., 2013; Krystallis and Chrysosoidis, 2005). The food quality labelling system, as discussed by Jürkenbeck (2023), plays a vital role in protecting traditional agricultural products and foodstuffs, particularly within the European context. The European food labelling system aims not only to protect consumers from false or misleading information regarding the origin of agricultural products but also to shield producers from anti-competitive practices (Martini and Menozzi, 2021; Grunert and Aachmann, 2016). Jürkenbeck (2023) and Bauer et al. (2013) argue that such labelling promotes the diversity of agricultural production, enhances the competitiveness of farmers and traditional producers, and informs consumers about the specific characteristics of labeled products. For consumers, labels that are protected by regulatory frameworks are a guarantee of quality and tradition.

1.1 Consumer Behavior Toward Organic Production Labels in the Czech Republic

Consumer behavior toward organic/BIO products, particularly in the Czech Republic, reflects a growing concern for ecological sustainability and health. BIO labels, such as the “Biozebra” and EU organic labels, are critical tools for consumers aiming to make environmentally conscious purchasing decisions. Research indicates that consumers in the Czech Republic, similar to global trends, increasingly prioritize the ecological impact of their food choices (Stolz et al., 2011; Bezawada and Pauwels, 2013). This shift is driven by a rising awareness of environmental issues, such as climate change, biodiversity loss, and the overuse of pesticides in conventional agriculture (Jürkenbeck, 2023; Martini and Menozzi, 2021; McCarthy et al., 2016).

According to Garnier and Bilen (2025), the ecological aspect of BIO products is a significant factor in consumer decision-making.

The demand for BIO products is partly fueled by the belief that organic farming practices contribute to environmental sustainability by reducing greenhouse gas emissions, preserving soil health, and promoting biodiversity (Bauer et al., 2013; Pino et al., 2012). Moreover, consumers who prioritize environmental considerations are more likely to trust and prefer products with recognized organic labels, as these labels assure adherence to stringent ecological standards (Martini and Menozzi, 2021; Grunert et al., 2014).

In addition to ecological concerns, other factors such as price, perceived prestige, and support for local producers also play a crucial role in shaping consumer behavior toward BIO products (Stolz et al., 2011; Printezis and Grebitus, 2018; Hughner et al., 2007). Price sensitivity remains a significant barrier, as Organic/BIO products are often priced higher than their conventional counterparts due to the more resource-intensive methods of organic farming (Jürkenbeck, 2023; Magnusson et al., 2003). However, for a segment of consumers, the perceived health benefits, along with the environmental impact, justify the higher cost (Bauer et al., 2013; Yiridoe et al., 2005).

1.2 The Ecological and Health Significance of Organic Products

Organic/BIO products are often heralded for their potential environmental benefits, including the reduction of greenhouse gases (GHGs) and nitrogen oxide emissions, the promotion of soil and water conservation, and the enhancement of biodiversity (European Commission, 2020; Crowder and Reganold, 2015; Saba et al., 2003). Organic farming practices, which underpin BIO product labelling, are designed to work in harmony with natural ecosystems, reducing the reliance on synthetic chemicals and promoting sustainable land use (Jürkenbeck, 2023; Seufert and Ramankutty, 2017; Tuck et al., 2014). However, the health benefits of BIO products are a subject of ongoing debate in the scientific community (Varzakas and Antoniadou, 2024; Martini and Menozzi, 2021). While some studies suggest that organic

foods may have higher nutritional content and lower levels of pesticide residues (Barański et al., 2014; Mie et al., 2017), others argue that the health advantages of BIO products are not significantly different from those of conventional foods (Garnier and Bilen, 2025; Dangour et al., 2009).

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1.4 Aim and Motivation

The primary objective and motivation of this article is to explain and compare consumer behavior toward two specific Organic/BIO labels in the Czech Republic—Biozebra and EU organic labelling by Czech customers. This comparison aims to understand how these labels influence consumer choices, with a particular

focus on the ecological and health considerations that drive the purchase of BIO products. Additionally, the article examines the broader implications of bioproduction on society, the environment, and the economy, aiming to provide insights that could guide state, industry and SME stakeholders in keeping and extending sustainable agricultural and food practices.

The following research questions were analyzed as part of the study:

- Does knowledge of Czech and European labelling of organic products depend on selected sociodemographic indicators?
- What attributes do consumers most often associate with organic products labeled with both Czech and European labelling?
- How does the perception of these attributes differ among respondents based on age, gender, and education?

2 METHODOLOGY AND DATA

This research compared the recognition of labelling systems and analysed the perception of different notions associated with the brands of organic products on both national and European level among the consumers in the Czech Republic and their dependence on selected socio-demographic indicators. As part of the research, a total of 982 responses from Czech respondents were included in further processing. This is a quota selection; individual categories are listed in Tab. 1. Respondents from the youngest generation, Generation Alpha, were grouped together with Generation Z respondents. No respondents from the Beta and Silent Generations participated in the study. The research was conducted in 2024 via an online questionnaire.

The methods of logistic regression, analysis of contingency tables, correspondence maps, and analysis of variance were chosen for the analysis of the obtained data. Logistic regression allows for the detection of factors influencing whether the observed phenomenon occurs and to assess the level of their influence. These can include both numerical and categorized variables, such as selected socio-demographic indicators – age,

gender, and consumer education. It is then possible to estimate in individual cases the probability of the observed phenomenon based on the values of these explanatory variables.

Individual sub-dependencies of the selected questions on socio-demographic variables (gender, age, education) were analysed with the use of contingency tables. Correspondence analysis is a popular graphical technique enabling the analysis of relations between the categories of one or more variables in contingency tables. Using the tools of correspondence analysis, it is possible to describe the associations of nominal or ordinal variables in different categories of variables and to obtain a graphical representation of the relationships in a multidimensional space.

Additionally, in order to compare the results between different citizen groups, the authors employed analysis of variance.

The Kruskal–Wallis test by ranks is a non-parametric method for testing whether samples originate from the same distribution. It is used for comparing two or more independent samples of equal or different sample sizes. It extends the Mann–Whitney U test when there are

Tab. 1: Sample of respondents

Country	Variables	Values	Percentage
Czech Republic	Sex	Women	47.66%
		Men	52.34%
	Age	Generation Z (1997 and later)	25.87%
		Generation Y (1982–1996)	26.07%
		Generation X (1965–1981)	24.95%
		Baby boomers (1946–1964)	23.12%
	Education	Primary	14.77%
		Secondary	28.11%
		Secondary with high school diploma	32.79%
		Tertiary	24.34%

only two groups. Null hypothesis assumes Null hypothesis assumes that the mean ranks of the groups are the same. It can be used as an alternative to the parametric one-way analysis of variance (ANOVA) when the population cannot be assumed to be normally distributed. The Kruskal–Wallis test can be used for ranked or ordinal data. A significant Kruskal–Wallis test indicates that at least one sample stochastically dominates one other sample. The test does not identify where this stochastic dominance occurs or for how many pairs of groups stochastic dominance obtains.

Test statistic with asymptotically χ^2 distribution with $c - 1$ degrees of freedom is

$$H = \left[\frac{12}{n(n+1)} \sum_{j=1}^c \frac{T_j^2}{n_j} \right] - 3(n+1),$$

where n is the sum of sample sizes for all groups, c is the count of groups, T_j is the sum of ranks in j -th group and n_j is the size of the j -th group. The authors opted for post-hoc testing in order to determine specific differences between individual groups. The Dwass–Steel–Critchlow–Fligner (DSCF) test is a nonparametric post-hoc procedure used to compare all possible pairs

of groups after a significant Kruskal–Wallis test, see (Anděl, 2005; Hendl, 2006).

The calculations were performed with the help of the UNISTAT, SPSS, Statistica, and Jamovi software, like the authors (Smoluk-Sikorska et al., 2020; Rojík et al., 2022; Zámková et al., 2020, 2022, 2024). The results of this research may serve as a way to define and refine the target groups and to create the target consumer group’s profile.

The statistical methods described above were used to test hypotheses based on the research questions outlined in Chapter 1.5. Logistic regression was used to determine the relationship between awareness of Czech and European organic product labelling and selected sociodemographic indicators. The evaluation of the attributes that consumers most frequently associate with organic products labeled with both Czech and European labels was conducted using contingency table analysis and correspondence analysis. At the same time, nonparametric analysis of variance (Kruskal–Wallis test and post-hoc testing) was used to determine how this perception differs among respondents based on age, gender, and education.

3 RESULTS

This study aims to compare the recognition of labelling systems and analyses the associations consumers in the Czech Republic make with

regard to the labels on organic products on both national and European level and their dependence on selected socio-demographic indi-

cators. First of all, the overall dependence was examined, which means all selected parameters were considered, using logistic regression. The recognition of the labelling system was coded as 1 (yes) and 0 (no). The rising values of socio-demographic indicators were defined on an increasing scale of 0, 1, 2, ..., with the exception of gender, which was coded as 1 (male) and 0 (female).

The results of the logistic regression for the Czech labelling system “biozebra” are listed in Tab. 2a and Tab. 2b, which includes the values of regression coefficient, standard error, the value of the Wald statistics, the *p*-value of each regression coefficient, and the confidence interval for the value of regression coefficient.

Based on the results of the logistic regression, see Tab. 2a, it is clear that the recognition of the Czech “biozebra” system is only insignificantly depending on the selected identification questions. However, there is a significant dependence on the age of the respondents. The

signs of regression coefficients indicate that the recognition of this labelling system decreases with the increasing age of respondents. The dependence on other parameters was not statistically significant, however the signs of regression coefficients clearly imply that women are somewhat more familiar with the “biozebra” label than men. The recognition of the label increases with higher education as well. The results of the logistic regression after removing the non-significant variables are presented in Tab. 2b.

As for the European labelling system, based on the results of the logistic regression, see Tab. 3a and Tab. 3b, it is clear that the recognition of the European system is again only insignificantly depending on the selected identification questions. The dependence on the respondents’ education shows borderline values. According to the signs of regression coefficients it may be argued that the recognition of the European organic produce labelling system increases with education. The dependence on

Tab. 2: Regression model parameters – Czech organic food labelling
Part a)

Logistic regression	Coefficient	Standard Error	Wald Statistic	Significance	Lower 95%	Upper 95%
Constant	1.70	0.23	54.74	0.00	1.25	2.15
Gender	−0.03	0.17	0.03	0.86	−0.36	0.30
Age	−0.16	0.08	4.46	0.03	−0.31	−0.01
Education	0.09	0.09	1.01	0.31	−0.08	0.25

Part b) after removing the non-significant variables

Logistic regression	Coefficient	Standard Error	Wald Statistic	Significance	Lower 95%	Upper 95%
Constant	1.84	0.14	152.02	0.00	1.54	2.13
Age	−0.17	0.08	4.85	0.03	−0.32	−0.02

Tab. 3: Regression model parameters – European organic food labelling
Part a)

Logistic regression	Coefficient	Standard Error	Wald Statistic	Significance	Lower 95%	Upper 95%
Constant	0.27	0.17	2.53	0.11	−0.06	0.61
Gender	−0.22	0.13	2.89	0.09	−0.48	0.03
Age	−0.01	0.06	0.03	0.86	−0.13	0.11
Education	0.13	0.07	3.71	0.05	−0.00	0.25

Part b) after removing the non-significant variables

Logistic regression	Coefficient	Standard Error	Wald Statistic	Significance	Lower 95%	Upper 95%
Constant	0.14	0.12	1.19	0.28	−0.11	0.38
Education	0.13	0.06	3.96	0.05	0.00	0.26

other parameters was not statistically significant, however the signs of regression coefficients clearly imply that women are more familiar with the European label than men. The results of the logistic regression after removing the non-significant variables are presented in Tab. 3b.

Tab. 4: Organic food labelling

Organic food labelling	Czech	European
Higher quality, Health	24.2%	17.7%
Luxury, Prestige	6.0%	7.2%
Ecology, Environmental friendliness	34.3%	19.5%
Supporting domestic, producers	9.5%	4.5%
Higher price	8.9%	9.8%
I don't know this brand	17.1%	41.3%

Overall, consumers tend to associate the Czech “Product of organic farming” label (so called “biozebra”) most often with ecology and environmental friendliness. The respondents also seemed to associate these labels with higher product quality while they also perceived the food in question as healthier, see Tab. 4. The European label was most often associated with ecology and environmental friendliness, higher quality, and was perceived as healthier. Consumers proved to be much less familiar with the European labelling system than with the national “biozebra” label, see Fig. 1.

The development of the dependencies may be observed in greater detail thanks to the contingency tables’ and correspondence maps’ analysis. There are no significant differences in the perception of the “biozebra” label when it comes to respondents and their gender. A significantly larger number of women perceive the European labelling as ecological and environmentally friendly. Women have better knowledge of both labelling systems, see Tab. 5.

The least impressed by supposed higher quality of products labelled as “biozebra” seems to be Generation X. Generation Z on the other hand are most skeptical about the quality and health benefits of the European label. When it comes to ecology and environmental friendliness, Generation X seems to be the most in favor of the “biozebra” label. Generation Z are the strongest believers in the eco-nature of the European label. The respondents do not overly associate any of the labelling systems with any support towards domestic producers. However, when it comes to the Czech label, this perception is twice as high compared to the European system. The higher the age of respondents, the higher their acceptance of the “biozebra” products’ price. Younger respondents (Generation Z) clearly do not perceive these foods as expensive (see values for European labelling system). Members of

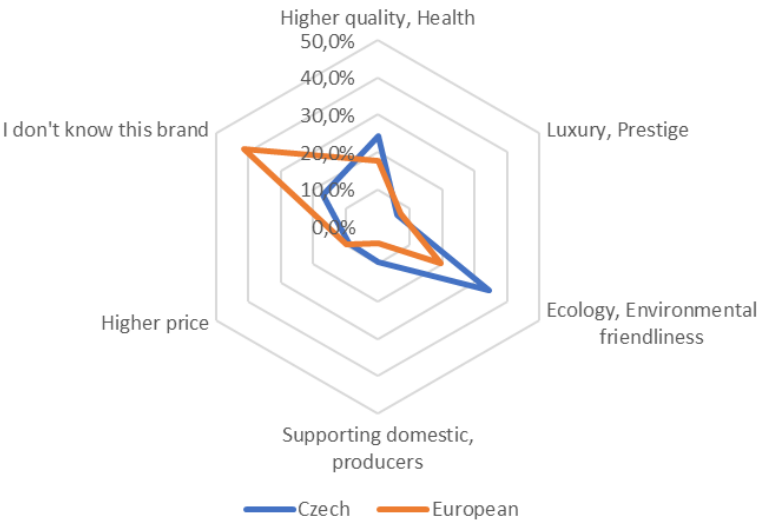


Fig. 1: Czech and European organic food labelling

Generations X and Y are the ones most familiar with the European labelling-system for organic food. The “biozebra” label is most recognized by consumers from Generation Z. In their case, there is a statistically significant dependence (p -value = 0.01).

As shown in the correspondence map, Generation X in most cases agree that the “biozebra” label supports local producers. Baby boomers are the ones least familiar with this label and most likely to associate it with higher price, see Fig. 2.

As for the European label for organic food, Baby boomers are most likely to associate it with higher quality. Additionally, Generation Z often perceives the European label as ecological, see Fig. 3.

The perception of both labelling-systems as proofs of quality and healthy products increases with the education of respondents, see Tab. 8 and Tab. 9. Conversely, the perception that any of these labels could signify luxury or prestige tend to decrease with higher education. Mainly consumers with higher education tend to associate both labels with ecological and environmentally friendly products. Respondents with lower education are the most likely to associate European labels with the support towards local producers. The higher the education of respondents, the less likely they are to associate the “biozebra” label with higher price. Respondents with finished secondary education and a diploma are the most likely to associate products with European labels with higher prices. The recognition of both labelling

Tab. 5: Organic food labelling & Sex

Organic food labelling	Czech		European	
	Men	Women	Men	Women
Higher quality, Health	24.12%	24.36%	18.68%	16.67%
Luxury, Prestige	6.81%	5.13%	6.61%	7.91%
Ecology, Environmental friendliness	33.07%	35.68%	17.12%	22.01%
Supporting domestic, producers	9.92%	8.97%	4.86%	4.06%
Higher price	8.75%	8.97%	8.75%	10.90%
I don't know this brand	17.32%	16.88%	43.97%	38.46%

Tab. 6: Czech organic food labelling

Organic food labelling	Gen Z	Gen Y	Gen X	Baby boomers
Higher quality, Health	27.95%	23.83%	20.41%	24.67%
Luxury, Prestige	5.91%	8.20%	4.49%	5.29%
Ecology, Environmental friendliness	35.83%	33.98%	40.82%	25.99%
Supporting domestic, producers	10.63%	6.64%	11.43%	9.25%
Higher price	6.69%	8.20%	8.98%	11.89%
I don't know this brand	12.99%	19.14%	13.88%	22.91%

Tab. 7: European organic food labelling

Organic food labelling	Gen Z	Gen Y	Gen X	Baby boomers
Higher quality, Health	14.96%	18.75%	17.96%	19.38%
Luxury, Prestige	7.09%	8.20%	8.57%	4.85%
Ecology, Environmental friendliness	22.83%	18.75%	17.55%	18.50%
Supporting domestic, producers	3.15%	6.25%	6.12%	2.20%
Higher price	7.48%	11.33%	10.61%	9.69%
I don't know this brand	44.49%	36.72%	39.18%	45.37%

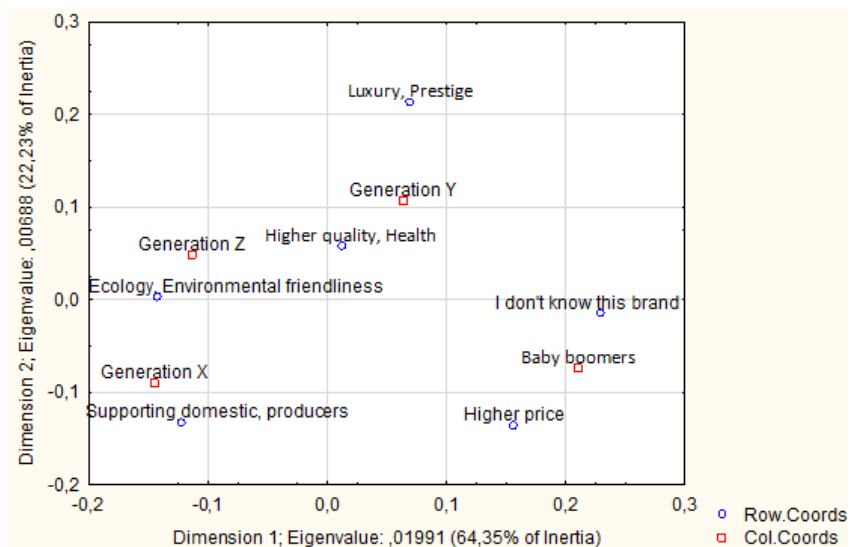


Fig. 2: Czech organic food labelling & Age

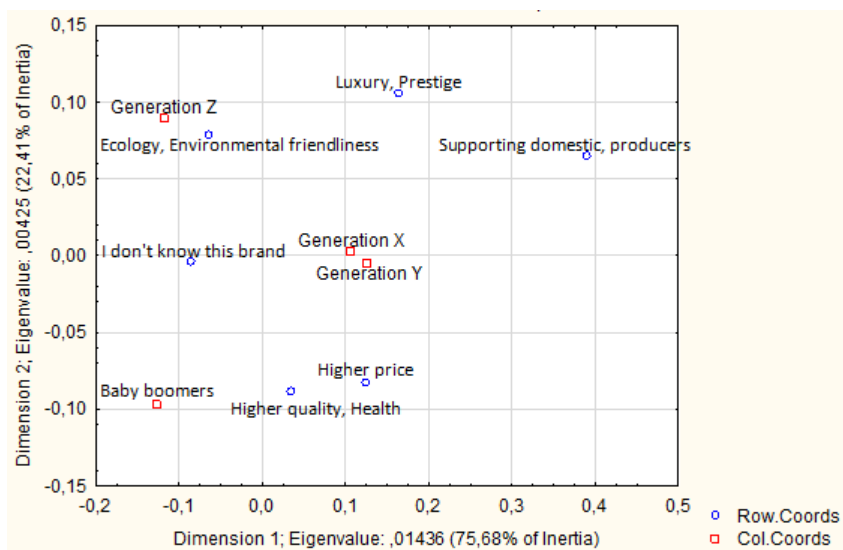


Fig. 3: European organic food labelling & Age

Tab. 8: Czech organic food labelling & Education

Organic food labelling	Primary	Secondary	Secondary with high school diploma	Tertiary
Higher quality, Health	20.69%	24.64%	24.53%	25.52%
Luxury, Prestige	9.66%	7.25%	5.28%	3.35%
Ecology, Environmental friendliness	27.59%	30.43%	36.96%	39.33%
Supporting domestic, producers	8.97%	8.70%	10.56%	9.21%
Higher price	12.41%	11.59%	6.52%	6.69%
I don't know this brand	20.69%	17.39%	16.15%	15.90%

Tab. 9: European organic food labelling & Education

Organic food labelling	Primary	Secondary	Secondary with high school diploma	Tertiary
Higher quality, Health	10.34%	19.93%	20.19%	16.32%
Luxury, Prestige	10.34%	6.88%	8.07%	4.60%
Ecology, Environmental friendliness	13.10%	18.84%	18.32%	25.52%
Supporting domestic, producers	7.59%	2.90%	3.73%	5.44%
Higher price	8.28%	8.70%	13.35%	7.11%
I don't know this brand	50.34%	42.75%	36.34%	41.00%

systems increases with the education of respondents. Here as well was found a statistically significant dependence (p -value = 0.01).

The correspondence map clearly illustrates that respondents with elementary education are the most likely to associate Czech labelling with luxury and prestige. Respondents with a university degree tend to consider these products to be of higher quality, healthier and eco-friendly, see Fig. 4.

Respondents from both categories of secondary education tend to associate the European label with higher quality of products most often. Similarly, to the Czech label, the European logo is often perceived as a sign of ecology by respondents with tertiary education, see Fig. 5.

Additionally, in order to compare the results between different citizen groups, the authors employed non-parametric analysis of variance. A decreasing scale was used in order to differentiate the intensity of perception (1 = strongly agree; 7 = strongly disagree). The results of the non-parametric analysis of variance indicate that based on gender, there are no significant differences between individual citizen groups, see Tab. 10.

The results of the non-parametric analysis of variance indicate that as for age, there are no significant differences between individual citizen groups, see Tab. 11.

The results of the non-parametric analysis of variance indicate that when it comes to education, there are significant differences between individual citizen groups only in the case of price perception (eco-labels are perceived as more expensive compared to normal food) and another difference is in the perceived support

of local producers and their eco-friendliness, see Tab. 12.

Tab. 10: Kruskal–Wallis test – Sex

	<i>H</i>	<i>df</i>	<i>p</i>
Higher quality, Health	2.52	1	0.113
Luxury, Prestige	0.09	1	0.768
Ecology, Environmental friendliness	0.33	1	0.567
Supporting domestic, producers	1.08	1	0.298
Higher price	0.52	1	0.471

Tab. 11: Kruskal–Wallis test – Age

	<i>H</i>	<i>df</i>	<i>p</i>
Higher quality, Health	5.49	3	0.139
Luxury, Prestige	1.73	3	0.631
Ecology, Environmental friendliness	0.31	3	0.958
Supporting domestic, producers	5.25	3	0.154
Higher price	3.71	3	0.295

Tab. 12: Kruskal–Wallis test – Education

	<i>H</i>	<i>df</i>	<i>p</i>
Higher quality, Health	7.35	3	0.062
Luxury, Prestige	1.20	3	0.753
Ecology, Environmental friendliness	9.40	3	0.024
Supporting domestic, producers	10.75	3	0.013
Higher price	14.84	3	0.002

Tab. 13a and Tab. 14 is a clear demonstration of the fact that the post-hoc analysis proved significant difference in the perception of products with eco-labels as more expensive by respondents with elementary, secondary (with diploma), and tertiary education. Respondents

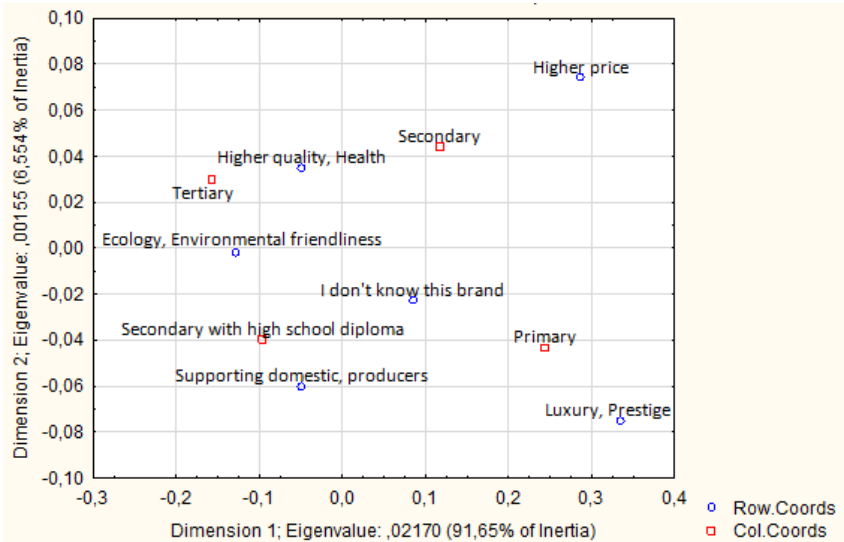


Fig. 4: Czech organic food labelling & Education

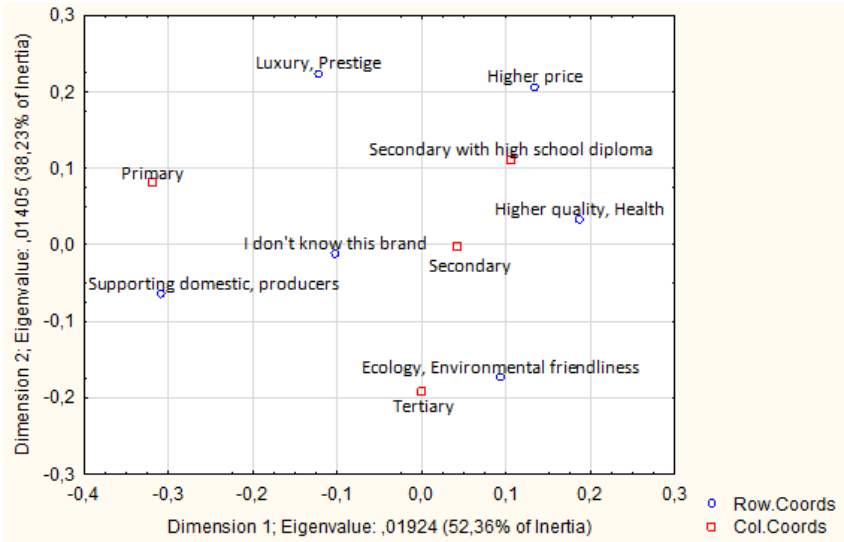


Fig. 5: European organic food labelling & Education

with elementary education are significantly more likely to perceive the products as more expensive.

As shown in Tab. 13b and Tab. 14, the post-hoc analysis revealed a significant difference in the perceived support towards local producers of both of these eco-labels when comparing the respondents with elementary education and

secondary education (diploma). Respondents with elementary education are significantly less likely to perceive these products as helpful for local producers. Tab. 13c depicts the results of the post-hoc analysis focusing on perceived ecological and environmentally friendly nature of these labelling-systems.

Tab. 13: Pairwise comparisons – a) Education × Higher price; b) Education × Supporting domestic, producers; c) Education × Ecology, Environmental friendliness (A = Primary; B = Secondary; C = Secondary with high school diploma; D = Tertiary)

	a) Education × Higher price		b) Education × Supporting domestic, producers		c) Education × Ecology, Environmental friendliness	
	<i>W</i>	<i>p</i>	<i>W</i>	<i>p</i>	<i>W</i>	<i>p</i>
D B	−2.99	0.150	1.33	0.784	2.94	0.160
D C	0.07	1.000	−1.45	0.733	−0.34	0.995
D A	−4.56	0.007	2.93	0.161	2.47	0.299
B C	2.98	0.151	−2.98	0.151	−3.53	0.061
B A	−1.95	0.514	1.97	0.502	−0.07	1.000
C A	−4.56	0.007	4.33	0.012	2.98	0.151

Tab. 14: Kruskal–Wallis test – Mean Rank (A = Primary; B = Secondary; C = Secondary with high school diploma; D = Tertiary)

	A	B	C	D
Higher price	428.09	468.85	518.61	519.61
Supporting domestic, producers	545.04	506.80	459.80	484.06
Ecology, Environmental friendliness	522.47	522.58	465.67	471.61

4 DISCUSSION

The results of this study provide important insights into the perception and knowledge of organic product labels among Czech consumers. As the analysis has shown, the familiarity with the Czech organic label “biozebra” and the European organic label varies significantly across different demographic groups, highlighting key factors that influence consumer behavior in the context of organic food consumption. One of the main findings is that knowledge of the Czech national label “biozebra” decreases with age, suggesting that younger consumers are more familiar with this national certification. This trend may be attributed to the increasing environmental awareness among younger generations, which aligns with findings from studies by Kareklas et al. (2014) and Yadav (2016), who identified ecological concern as a primary motivator for purchasing organic products. On the other hand, the relatively higher recognition of the European organic label among more educated consumers suggests a correlation between education and the likelihood of being informed about international certifications, as noted in the literature on food labelling (Jürkenbeck, 2023; Grunert and Aachmann, 2016).

The association of both labels with higher quality and health benefits among consumers is consistent with previous research that suggests consumers perceive organic products as superior in quality and more beneficial for health (Magnusson et al., 2003; Smith-Spangler et al., 2012). However, it is noteworthy that while these associations are strong, a significant portion of the population remains unaware of the European label, indicating a potential gap in consumer education or marketing efforts regarding this certification. This finding underscores the need for targeted communication strategies, particularly towards less informed demographics, as suggested by Grunert et al. (2014). Additionally, the higher association of organic labels with environmental friendliness among women aligns with global trends indicating that women are generally more concerned about ecological issues (McCarthy et al., 2016). This gender difference in the perception of organic labels may provide valuable guidance for marketers aiming to strengthen the appeal of organic products among male consumers.

The study also reveals that price sensitivity continues to be a barrier to the wider adoption of organic products, despite the perceived benefits. This is particularly evident among consumers with lower educational levels, who are more likely to associate organic products with luxury and higher costs. This observation resonates with the findings of Hughner et al. (2007) and Bezawada and Pauwels (2013), who emphasized that while price remains a significant factor, the perceived health and environmental benefits can justify the premium for certain consumer segments.

5 CONCLUSIONS

As part of the research question regarding the attributes with which consumers most often associate organic products labeled with both Czech and European labelling, it was found that products labelled with the Czech logo are most often associated with ecology and environmental friendliness. The respondents also seem to associate these labels with higher product quality while they perceive the food in question as healthier too. The European label tends to be most often associated with ecology and environmental friendliness, higher quality, and is also perceived as healthier. Czech consumers proved to be much less familiar with the European labelling system than with the national “biozebra” logo.

As part of the research question regarding knowledge of Czech and European labelling of organic products this study furthermore focused on the perception of these labelling systems and its dependence on selected socio-demographic indicators. There are no significant differences in the perception of the “biozebra” label when it comes to respondents and their gender. A significantly larger number of women perceive the European labelling as ecological and environmentally friendly. Both labelling systems are more often recognized by women.

Regarding the research question examining perceptions of how perceptions of attributes differ among respondents based on age, gender, and education, it was found that the least im-

Finally, the lack of strong associations between organic labels and the support for domestic producers indicates an area where both national and European labels could enhance their appeal. As local production becomes increasingly valued in the context of sustainability, emphasizing the connection between organic certification and local economic support could strengthen consumer loyalty, particularly among older generations and those with higher educational levels (Garnier and Bilen, 2025; Pino et al., 2012).

pressed by supposed higher quality of products labelled as “biozebra” seems to be Generation X. Generation Z on the other hand is most skeptical about the associated quality and health benefits. When it comes to ecology and environmental friendliness, Generation X seems to be the most in favor of the “biozebra” label. Conversely, Generation Z are the strongest believers in the eco-nature of the European label. Consumers are not likely to associate any of the labelling systems with any support that would be going towards local producers, only the correspondence map shows that Generation X most strongly agrees that the “biozebra” label constitutes a sign of any such support. Still, when it comes to the Czech label, this perception (as being supportive towards local producers) is twice as high compared to the European system. The higher the age of respondents, the higher their acceptance of the “biozebra” products’ price. Baby boomers are the ones least familiar with this label and most likely to associate it with higher price. Younger respondents (Generation Z) clearly do not perceive foods with the European logo as expensive. Baby boomers are most likely to associate it with higher quality. Members of Generations X and Y are the ones most familiar with the European labelling-system for organic food. The “biozebra” label is most recognized by consumers from Generation Z.

The perception of both labelling-systems as proofs of quality and healthy products

increases with the education of respondents. Respondents from both categories of secondary education tend to associate the European label with higher quality of products most often. Conversely, the perception that any of these labels could signify luxury or prestige tends to decrease with higher education. Mainly consumers with higher education tend to associate both labels with ecological and environmentally friendly products. The higher the education of respondents, the less likely they are to associate the “biozebra” label with higher price. The post-hoc testing revealed the following results: Respondents with elementary education are significantly more likely to perceive both labelling systems as such (expensive) than respondents with the highest education; There is a significant difference in the perceived support towards local producers of both of these eco-labels when comparing the respondents with elementary education and secondary education (diploma). Respondents with elementary education are significantly less likely to perceive these products

as helpful for local producers. The recognition of both labelling systems increases with the education of respondents.

The results of the research showed that the Ministry of Agriculture of the Czech Republic, as the coordinator and guarantor of organic/bio product labelling, should focus its communication campaign to promote organic products on the communication of these products in relation to ecology, especially to the youngest age group, and to consumers with secondary and higher education, who are the most prospective customer group for these products. In conclusion, the findings also suggest that for the Ministry of Agriculture in the Czech Republic, the focus of promotional campaigns should be on enhancing awareness and knowledge of both national and European organic labels, particularly emphasizing their environmental benefits. Such efforts should be tailored to resonate with younger consumers and those with higher education, who represent the most promising market segments for organic products.

6 REFERENCES

- ANDĚL, J. 2005. *Základy matematické statistiky*. 1st ed. Praha: MatfyzPress. ISBN 80-86732-40-1.
- ASCHEMANN-WITZEL, J. and ZIELKE, S. 2017. Can't Buy Me Green? A Review of Consumer Perceptions of and Behavior Toward the Price of Organic Food. *The Journal of Consumer Affairs*, 51 (1), 211–251. DOI: 10.1111/joca.12092.
- BARAŃSKI, M., SREDNICKA-TOBER, D., VOLAKAKIS, N., SEAL, C., SANDERSON, R., STEWART, G. B., BENBROOK, C., BIAVATI, B., MARKELLOU, E., GIOTIS, C., GROMADZKA-OSTROWSKA, J., REMBIAŁKOWSKA, E., SKWARLO-SOŃTA, K., TAHVONEN, R., JANOVSKÁ, D., NIGGLI, U., NICOT, P. and LEIFERT, C. 2014. Higher Antioxidant and Lower Cadmium Concentrations and Lower Incidence of Pesticide Residues in Organically Grown Crops: A Systematic Literature Review and Meta-Analyses. *British Journal of Nutrition*, 112 (5), 794–811. DOI: 10.1017/S0007114514001366.
- BAUER, H. H., HEINRICH, D. and SCHÄFER, D. B. 2013. The Effects of Organic Labels on Global, Local, and Private Brands More Hype than Substance? *Journal of Business Research*, 66 (8), 1035–1043. DOI: 10.1016/j.jbusres.2011.12.028.
- BEZAWADA, R. and PAUWELS, K. 2013. What is Special about Marketing Organic Products? How Organic Assortment, Price, and Promotions Drive Retailer Performance. *Journal of Marketing*, 77 (1), 31–51. DOI: 10.1509/jm.10.0229.
- CROWDER, D. W. and REGANOLD, J. P. 2015. Financial Competitiveness of Organic Agriculture on a Global Scale. *Proceedings of the National Academy of Sciences*, 112 (24), 7611–7616. DOI: 10.1073/pnas.1423674112.
- Czech Ministry of Agriculture. 2019. *Market of Organic Products* [online]. Available at: <http://eagri.cz/public/web/en/mze/organic-production-and-organic-food/the-market-and-trade-in-organic-food>. [Accessed 2025, August 22].
- Czech Union of Commerce and Tourism. 2021. *Czech Organic Food Market* [online]. Available at: <https://www.socr.cz/zpravodajstvi/nejvice-biopotravin-nakupujeme-v-retezcich>. [Accessed 2025, August 22].
- DANGOUR, A. D., DODHIA, S. K., HAYTER, A., ALLEN, E., LOCK, K. and UAUY, R. 2009. Nutritional Quality of Organic Foods: A Systematic Review. *The American Journal of Clinical Nutrition*, 90 (3), 680–685. DOI: 10.3945/ajcn.2009.28041.

- DIMITRI, C. and DETTMANN, R. L. 2012. Organic Food Consumers: What Do We Really Know About Them? *British Food Journal*, 114 (8), 1157–1183. DOI: 10.1108/00070701211252101.
- DITSCHUN, T. L. 2010. Nurturing and Preserving the Sensory Qualities of Nature. In DUBÉ, L., BECHARA, A., DAGHER, A., DREWNOWSKI, A., LEBEL, J., JAMES, P. and YADA, R. Y. (eds.). *Obesity Prevention: The Role of Brain and Society on Individual Behavior*, Chapter 45, pp. 555–566. DOI: 10.1016/B978-0-12-374387-9.00045-3.
- European Commission. 2020. *Organic Farming: A Sustainable Model for Europe* [online]. Available at: https://ec.europa.eu/info/food-farming-fisheries/farming/organic-farming_en. [Accessed 2025, June 2].
- GARNIER, J. and BILEN, G. 2025. Toward Sustainability of Territorial Agro-Food Systems in Europe: Indicators for Assessing Alternative Scenarios. *Environmental Research Letters*, 20 (9), 094059. DOI: 10.1088/1748-9326/adf97e.
- GRUNERT, K. G. 2005. Food Quality and Safety: Consumer Perception and Demand. *European Review of Agricultural Economics*, 32 (3), 369–391. DOI: 10.1093/eurrag/jbi011.
- GRUNERT, K. G., HIEKE, S. and WILLS, J. 2014. Sustainability Labels on Food Products: Consumer Motivation, Understanding and Use. *Food Policy*, 44, 177–189. DOI: 10.1016/j.foodpol.2013.12.001.
- GRUNERT, K. G., and AACHMANN, K. 2016. Consumer Reactions to the Use of EU Quality Labels on Food Products: A Review of the Literature. *Food Control*, 59, 178–187. DOI: 10.1016/j.foodcont.2015.05.021.
- HENDL, J. 2006. *Přehled statistických metod zpracování dat: Analýza a metaanalýza dat*. 2nd ed. Praha: Portál. ISBN 80-7367-123-9.
- HUGHNER, R. S., McDONAGH, P., PROTERO, A., SHULTZ, C. J. and STANTON, J. 2007. Who Are Organic Food Consumers? A Compilation and Review of Why People Purchase Organic Food. *Journal of Consumer Behaviour: An International Research Review*, 6 (2–3), 94–110. DOI: 10.1002/cb.210.
- Institute of Agricultural Economics and Information. 2021. *Yearbook-Organic Food Market in the Czech Republic* [online]. Available at: <https://www.lovime.bio/knihovna/zprava-o-trhu-s-biopotravinami-v-cr-od-2009>. [Accessed 2025, June 10].
- JANSSEN, M. and HAMM, U. 2012. Product Labelling in the Market for Organic Food: Consumer Preferences and Willingness-to-Pay for Different Organic Certification Logos. *Food Quality and Preference*, 25 (1), 9–22. DOI: 10.1016/j.foodqual.2011.12.004.
- JÜRKENBECK, K. 2023. Consumer Trust in Organic Food Producers and Its Influence on Consumers' Attitudes Toward Food Reformulation and Its Sensory Consequences. *Food and Humanity*, 1, 793–799. DOI: 10.1016/j.foohum.2023.07.031.
- KAREKLAS, I., CARLSON, J. R. and MUEHLING, D. D. 2014. “I Eat Organic for My Benefit and Yours”: Egoistic and Altruistic Considerations for Purchasing Organic Food and Their Implications for Advertising Strategists. *Journal of Advertising*, 43 (1), 18–32. DOI: 10.1080/00913367.2013.799450.
- KRISTIANSEN, P., TAJI, T. and REGANOLD, J. (eds.). 2006. *Organic Agriculture: A Global Perspective*. CABI. ISBN 978-1-84593-169-8.
- KRYSTALLIS, A. and CHRYSOHOIDIS, G. 2005. Consumers' Willingness to Pay for Organic Food: Factors that Affect It and Variation per Organic Product Type. *British Food Journal*, 107 (5), 320–343. DOI: 10.1108/00070700510596901.
- LOCKERETZ, W. (ed.). 2011. *Organic Farming: An International History*. CABI. ISBN 978-1-84593-876-5.
- LOCKIE, S., LYONS, K., LAWRENCE, G. and MUMMERY, K. 2002. Eating ‘Green’: Motivations Behind Organic Food Consumption in Australia. *Sociologia Ruralis*, 42 (1), 23–40. DOI: 10.1111/1467-9523.00200.
- MAGNUSSON, M. K., ARVOLA, A., HURSTI, U.-K., ÅBERG, L. and SJÖDÉN, P.-O. 2003. Choice of Organic Foods is Related to Perceived Consequences for Human Health and to Environmentally Friendly Behaviour. *Appetite*, 40 (2), 109–117. DOI: 10.1016/S0195-6663(03)00002-3.
- MARTINI, D. and MENOZZI, D. 2021. Food Labeling: Analysis, Understanding, and Perception. *Nutrients*, 13 (1), 268. DOI: 10.3390/nu13010268.
- MCCARTHY, B., LIU, H.-B. and CHEN, T. 2016. Innovations in the Agro-Food System: Adoption of Certified Organic Food and Green Food by Chinese Consumers. *British Food Journal*, 118 (6), 1334–1349. DOI: 10.1108/BFJ-10-2015-0375.
- MIE, A., ANDERSEN, H. R., GUNNARSSON, S., KAHL, J., KESSE-GUYOT, E., REMBIAŁKOWSKA, E., GUAGLIO, G. and GRANDJEAN, P. 2017. Human Health Implications of Organic Food and Organic Agriculture: A Comprehensive Review. *Environmental Health*, 16 (1), 111. DOI: 10.1186/s12940-017-0315-4.
- PADEL, S. and FOSTER, C. 2005. Exploring the Gap between Attitudes and Behaviour: Understanding Why Consumers Buy or Do Not Buy Organic Food. *British Food Journal*, 107 (8), 606–625. DOI: 10.1108/00070700510611002.

- PINO, G., PELUSO, A. M. and GUIDO, G. 2012. Determinants of Regular and Occasional Consumers' Intentions to Buy Organic Food. *The Journal of Consumer Affairs*, 46 (1), 157–169. DOI: 10.1111/j.1745-6606.2012.01223.x.
- PRINTEZIS, I. and GREBITUS, C. 2018. Marketing Channels for Local Food. *Ecological Economics*, 152, 161–171. DOI: 10.1016/j.ecolecon.2018.05.021.
- ROJÍK, S., ZÁMKOVÁ, M., CHALUPOVÁ, M., PILAŘ, L., PROKOP, M., STOLÍN, R., MALEC, K., APPIAH-KUBI, S. N. K., MAITAH, M., DZIEKAŃSKI, P. and PRUS, P. 2022. Pre-COVID-19 Organic Market in the European Union—Focus on the Czech, German, and Slovak Markets. *Agriculture*, 12 (1), 82. DOI: 10.3390/agriculture12010082.
- SABA, A. and MESSINA, F. 2003. Attitudes Towards Organic Foods and Risk/Benefit Perception Associated with Pesticides. *Food Quality and Preference*, 14 (8), 637–645. DOI: 10.1016/S0950-3293(02)00188-X.
- SEUFERT, V. and RAMANKUTTY, N. 2017. Many Shades of Gray—The Context-Dependent Performance of Organic Agriculture. *Science Advances*, 3 (3), e1602638. DOI: 10.1126/sciadv.1602638.
- SMOLUK-SIKORSKA, J., MALINOWSKI, M. and ŁUCZKA, W. 2020. Identification of the Conditions for Organic Agriculture Development in Polish Districts—An Implementation of Canonical Analysis. *Agriculture*, 10 (11), 514. DOI: 10.3390/agriculture10110514.
- SMITH-SPANGLER, C., BRANDEAU, M. L., HUNTER, G. E., BAVINGER, J. C., PEARSON, M., ESCHBACH, P. J., SUNDARAM, V., LIU, H., SCHIRMER, P., STAVE, C., OLKIN, I. and BRAVATA, D. M. 2012. Are Organic Foods Safer or Healthier Than Conventional Alternatives?: A Systematic Review. *Annals of Internal Medicine*, 157 (5), 348–366. DOI: 10.7326/0003-4819-157-5-201209040-00007.
- Statista. 2021. *US Market of Organic Products* [online]. Available at: <https://www.statista.com/statistics/262347/worldwide-spending-on-organic-products-by-country>. [Accessed 2025, June 15].
- STOLZ, H., STOLZE, M., HAMM, U., JANSEN, M. and RUTO, E. 2011. Consumer Attitudes Towards Organic versus Conventional Food with Specific Quality Attributes. *NJAS: Wageningen Journal of Life Sciences*, 58 (3–4), 67–72. DOI: 10.1016/j.njas.2010.10.002.
- TUCK, S. L., WINQVIST, C., MOTA, F., AHNSTRÖM, J., TURNBULL, L. A. and BENGTSSON, J. 2014. Land-Use Intensity and the Effects of Organic Farming on Biodiversity: A Hierarchical Meta-Analysis. *Journal of Applied Ecology*, 51 (3), 746–755. DOI: 10.1111/1365-2664.12219.
- VARZAKAS, T. and ANTONIADOU, M. 2024. A Holistic Approach for Ethics and Sustainability in the Food Chain: The Gateway to Oral and Systemic Health. *Foods*, 13 (8), 1224. DOI: 10.3390/foods13081224.
- VÁVROVÁ, J. and BERAN, V. 2025. Ethical Consumerism and Demographic Differences in Preferences for Regional Food Brands. *Innovative Marketing*, 21 (4), 159–174. DOI: 10.21511/im.21(4).2025.12.
- WILLER, H., TRÁVNÍČEK, J., MEIER, C. and SCHLATTER, B. (eds.). 2021. *The World of Organic Agriculture: Statistics and Emerging Trends 2021*. ISBN 978-3-03736-394-2.
- YADAV, R. 2016. Altruistic or Egoistic: Which Value Promotes Organic Food Consumption Among Young Consumers? A Study in the Context of a Developing Nation. *Journal of Retailing and Consumer Services*, 33, 92–97. DOI: 10.1016/j.jretconser.2016.08.008.
- YIRIDOE, E. K., BONTI-ANKOMAH, S. and MARTIN, R. C. 2005. Comparison of Consumer Perceptions and Preference Toward Organic Versus Conventionally Produced Foods: A Review and Update of the Literature. *Renewable Agriculture and Food Systems*, 20 (4), 193–205. DOI: 10.1079/RAF2005113.
- ZÁMKOVÁ, M., ROJÍK, S., PROKOP, M., ČINČALOVÁ, S. and STOLÍN, R. 2022. Czech Consumers' Preference for Organic Products in Online Grocery Stores during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 19 (20), 13316. DOI: 10.3390/ijerph192013316.
- ZÁMKOVÁ, M., ROJÍK, S., PROKOP, M., STOLÍN, R. and STŘELEČ, L. 2020. Methods for Categorical Data Analysis: Illustrating Consumer Behaviour with Relation to Organic Produce. In *Agrarian Perspectives XXIX: Trends and Challenges of Agrarian Sector*, pp. 426–433.
- ZÁMKOVÁ, M., ROJÍK, S., PROKOP, M., ČINČALOVÁ, S. and STOLÍN, R. 2024. National Labelling System of Organic Agriculture and Food Products—How Familiar Are Czech Consumers with the National Organic Agri-Food Brand? *Agriculture*, 14 (1), 100. DOI: 10.3390/agriculture14010100.

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