

CHANGEABILITY OF CONSUMER PREFERENCES CONCERNING THE METHODS OF FRUIT PRODUCTION

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Abstract. The purpose of the paper was to establish and compare consumer preferences concerning the methods of fruit production (traditional or organic ones) in the years 2001, 2003 and 2006 and the relations between the preferences and the socio-economic and demographic features of the consumers. The analysis was conducted on the basis of the data from surveys carried out among the inhabitants of Lublin. Results of those surveys point out that certain features of the consumers such as the sex, incomes and the family type significantly differentiated preferences concerning the method of fruit production. Increased incomes were connected with greater acceptance of the organic method, and their decrease was related to greater frequency of indicating the conventional method. Interest in the method of production, while buying the fruit was significantly higher among men than among women. Declaring the willingness to pay more for organic fruit was also correlated with the consumers' sex. Besides, in 2006 it was not too strongly related to the incomes of the respondents. In the years 2001 and 2006 changeability of preferences concerning the willingness to pay a higher price for organic fruit and no change in the interest in the technology of fruit production while purchasing the fruit were shown.

Key words: fruit, preferences, technology, organic farming

INTRODUCTION

Increasing environmental awareness of the society contributes to increased requirements towards food, which are extended over the method of production and environmental protection. These features have an influence on physical parameters, and above all on acceptance from the consumers [Jongen 2000]. They affect the consumers' behaviour in what they buy and greater acceptance towards the products of organic farm-

ing. In the consumers' opinions, organic food gives rise to fewer dangers to health and the environment; besides, it is tastier as compared to the products made by means of conventional methods [Szołtysek 2004, Żakowska-Biemans 2000]. The strength of these evaluations may be weakened in the case of fruit by the awareness that owing to the content of vitamins and mineral elements as well as other substances they are indispensable in rational nutrition and the prevention of many diseases. On the other hand, the production of many fruit species requires fairly intensive protection from diseases and pests, which increases the threat towards people and the environment.

According to the data of OECD, the sector of organic farming is the fastest growing sector of agriculture, which is estimated at the annual figure of 15-30% [The European... 2004]. Legal regulations establishing the general and detailed principles on which organic production in the countries of the European Union is based are included in the Council Regulation... [2007]. The data on the present state of organic farming in Poland and in the member states of the European Union as well as the changes observed over the years point to an increasing tendency of the number of organic farms and the area of organic cultivations [Rzepecka 2004]. It follows from the report by IJHAR-S (Agricultural and Food Quality Inspection) that in 2006 the structure of organic cultivations included about 10% of berry plantations and orchards (the state and tendencies in the development of organic agriculture in Poland, www.ijhar-s.gov.pl). According to Niewiadomski [2007], the factors limiting the development of organic agriculture in our country include, for example, a low demand for organic food and low incomes of the Poles as well as the vague difference that exists in the consumers' opinion between the properties of organic food and that produced by means of traditional methods. In the light of the presented data and opinions, the knowledge on the relations existing between the consumers' features and their choices concerning the technology of fruit production may, hence, be important from the point of view of the producers and the satisfaction of the consumers' increasing requirements.

The purpose of the paper was to determine and compare the consumers' opinions and declarations referring to the method of fruit production in the years 2001, 2003 and 2006 as well as the relations between the consumers' preferences and their socio-economic and demographic features.

MATERIAL AND METHODS

The analysis was conducted on the basis of the results of surveys carried out in the years 2001, 2006 and 2003 among the inhabitants of Lublin. The survey research was carried out with a method of a direct survey. The pollsters distributed the questionnaires to selected people and after they filled in the questionnaires, the pollsters collected them personally. As a result, almost 100% of the questionnaires were collected and the percentage of the answers to particular questions was diverse. 93.3% to 100% of answers was obtained in 2003, 88.5% to 91.8% in 2001 and 80.0% to 90.7% in 2006. The consumer sample in all periods was a quota sample reflecting the age structure of the inhabitants in five age groups (20-29, 30-39, 40-49, 50-59, and over 60 years old). In the years 2001 and 2003 the studies comprised 400 and 300 persons, respectively, and in 2006 – 504 persons. The studies took into consideration:

- the consumers' sex, their age and education (4 groups: elementary, vocational, secondary, university level),
- the biological type of the family (7 groups in 2001, and 8 groups in the following ones: childless marriage, family 1 child with, family 2 children with, family 3 children with, family 4 and more children with, single mother or father bringing child up, childless single person, multigeneration family),
- monthly incomes per person in the family (4 groups: up to 300 PLN, 301-500 PLN, 501-1000 PLN, and over 1001 PLN)
- the source of incomes (6 groups in 2001: income from hired work, income from hired work and from private farm in agriculture, income from private farm in agriculture, self-employed or working in free professions income, retirement, unearned source, and 5 groups in 2006 – without incomes from only private farm in agriculture),
- the explanatory variables.

The explained variables referred to the choice between the traditional and the organic methods of fruit production, the reasons for choosing the organic one and the interest in the method of production and the declaration to pay a higher price for organic fruit as expressing the preferences of the organic method.

The analysis of the correlations between the socio-economic and demographic features of the consumers on the one hand and the variables defining the preferences on the other hand was conducted on the basis of Pearson's linear correlation coefficient. A description of the relation between the explanatory and the explained variables in the years 2001 and 2006 was made by means of the model of multiple linear regressions.

Chi-square and V-Cramer statistics were used to determine the effect of the date of studies on their results. The null hypothesis on the independence of preferences concerning an interest in the method of fruit production during the purchase and a declaration to pay a higher price for organic fruit in the years 2001 and 2006 was verified. The level of significance connected with the value of statistics makes it possible to accept or reject the null hypothesis about the independence of preferences of the date of studies. The analysis took into consideration three levels of significance of the test $\alpha < 0.05$, $\alpha < 0.01$ and $\alpha < 0.001$. The necessary statistical calculations were performed in the SAS system version 9.1.

The chosen descriptive statistics of the consumer sample in the years 2001, 2006 and 2003 are provided in Table 1. Women (56-61%), who most frequently do the shopping in the household, dominated. 75-83% of the examined consumer sample were the persons with at least secondary education, including 28-36% with university education. Between 39 and 47% of the respondents declared their monthly incomes per person in the family within the range 501-1000 PLN, and 16-25% – over 1001 PLN. 7-13% of the respondents had their incomes at the level up to 300 PLN. Incomes from hired work were the prevailing source of incomes for about 55% of the respondents in 2006, and for 45% in 2001, while pension was the main source for 21-22%, and incomes from one's own economic activity – for 15-19%. The highest percentage of the respondents came from the families of 2 and more children – 45-50%, with the most numerous being the families of 2 children – 25-31% of the total studied population.

Table 1. Descriptive statistics of total consumer's sample and according to sex, age, education and income

Tabela 1. Statystyki opisowe próby konsumentów ogółem i według płci, wieku, wykształcenia i dochodów

Specification Wyszczególnienie	A – 2001 B – 2003 C – 2006	The consumer's sample (%) Próby konsumentów (%)		
		total ogółem	women kobiety	men mężczyźni
1	2	3	4	5
Total Ogółem	A B C	100 100 100	61 56 61	39 44 39
Age (years) – Wiek (lat):				
20-29	A B C	34 36 34	37 34 31	23 37 40
30-39	A B C	15 15 16	14 17 17	19 12 15
40-49	A B C	20 20 23	20 21 26	22 18 17
50-59	A B C	14 14 15	15 14 17	14 15 13
> 60	A B C	16 16 12	14 13 10	22 19 16
Education – Wykształcenie:				
elementary – podstawowe	A B C	10 10 5	9 7 5	11 14 4
vocational – zawodowe	A B C	15 12 12	16 14 11	15 9 16
secondary – średnie	A B C	39 50 50	37 52 55	38 47 23
university level – wyższe	A B C	36 28 33	38 27 30	36 30 37
Monthly income per family number (PLN) Dochody miesięczne na osobę w rodzinie (zł):				
< 300	A B C	13 11 7	16 11 8	9 11 6
301-500	A B C	32 27 21	31 27 25	30 26 16

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4	5
501-1 000	A	39	39	39
	B	43	46	47
	C	47	47	45
> 1 001	A	16	14	22
	B	16	16	16
	C	25	20	33

In 2001 N = 400, in 2003 N = 300, in 2006 N = 504.
 Source: own research.
 W 2001 roku N = 400, w 2003 roku N = 300, w 2006 roku N = 504.
 Źródło: badania własne.

RESULTS AND DISCUSSION

It follows from the studies that if there is a choice, then nearly 38% would choose the fruit produced by means of the traditional method, 30% – the organic method, and for 33% the method of production is of no importance. The respondents’ answers were significantly connected to their incomes. Differentiation of the answers depending on the incomes is presented in Figure 1.

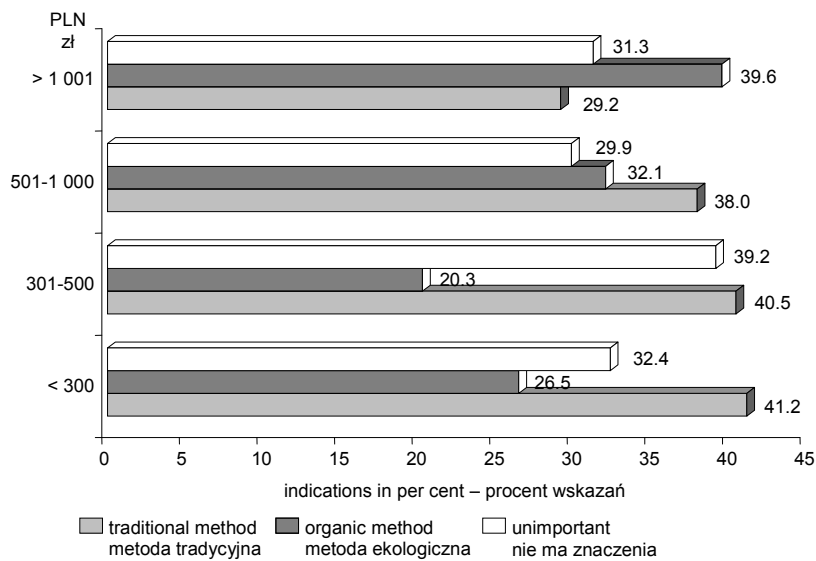


Fig. 1. Declaration of the choice between traditional and organic methods of fruit production considering the income of consumers in 2003 (indications in per cent)
 Rys. 1. Deklaracja wyboru pomiędzy owocami produkowanymi metodą tradycyjną a ekologiczną z uwzględnieniem dochodów konsumentów w 2003 roku (% wskazań)

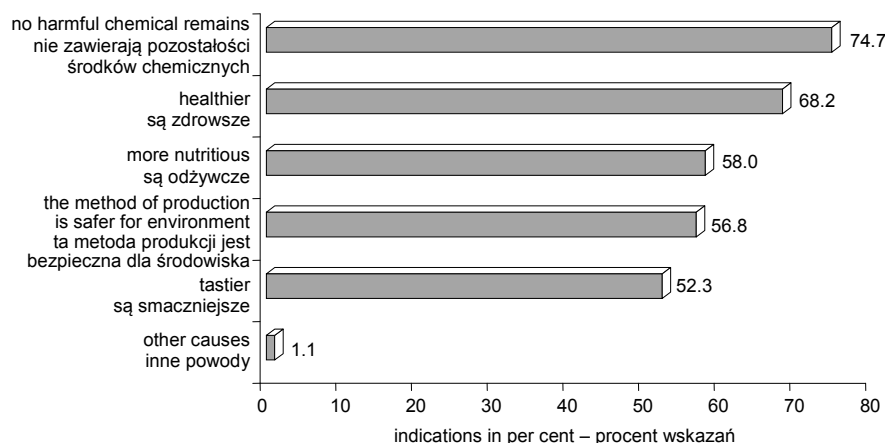


Fig. 2. Reasons for choosing the organic method in 2003 (indications in per cent)
Rys. 2. Motywy wyboru metody ekologicznej w 2003 roku (% wskazań)

Increased incomes were connected with greater acceptance of the organic method, and their decrease was related to a greater frequency of pointing to the traditional method. The reasons for choosing the organic method were not significantly connected with the consumers' features (Pearson's linear correlation coefficients were low and statistically insignificant at the level of significance $\alpha < 0.05$). The highest percentage of the examined persons chose organic fruit because they do not contain harmful remains of chemicals from the sprayings and fertilizers (75%) and they have better health values (62%). Almost every second respondent pointed out that organic fruit were tastier as compared to those produced by means of the traditional method, and 58% hold an opinion that they are more nutritious. Almost 57% choose organic fruit due to the fact that this method is environmentally-friendly.

According to a study conducted by CBOS (Centre for Public Opinion Research), in 2001 the method of production was important to 45% of the Polish respondents who bought food products. A higher percentage in this sphere was obtained among Hungarians (59%), Lithuanians (65%), Russians (51%), Romanians (78%), while a lower one – only among the Czech (32%) [Wenzel 2001].

The relation of demographic and socio-economic features of the consumers and their interest in the production method while buying fruit and a declaration to pay a higher price for organic fruit as an expression of approval of this method is presented in Tables 2 and 3. It can be concluded on the basis of the coefficients of Pearson's linear correlation that the interest in the production method while buying fruit is significantly related to the consumers' sex. This dependence did not become clear before the studies conducted in 2006. While in 2001 more than 35% male and 37% female respondents paid attention to the method of fruit production while buying them, in 2006, respectively, 42% and 30% of the respondents showed such an interest. A lower percentage of indications as far as women are concerned may result from the fact that women, together with men, are now more and more involved in maintaining the proper level of the household; as compared to the year 2001 they are more often engaged in professional work and, additionally, with household duties.

Table 2. Coefficient of Pearson linear correlation for examined variables
Tabela 2. Współczynniki korelacji linowej Pearsona dla badanych zmiennych

Variables Zmienne	A – 2001 B – 2006	Sex Płeć	Age Wiek	Education Wy- kształce- nie	Type of family Typ rodziny	Income PLN/person Dochody zł/osobę	Source of income Źródło utrzyma- nia rodziny
Interest in the method of fruit production during shopping (0-1) ¹ Zainteresowanie metodą produkcji podczas zakupu (0-1) ¹	A	0.03	0.07	0.08	0.04	-0.02	-0.02
	B	0.10*	-0.02	0.06	0.08	0.03	-0.01
Declaration of paying a higher price for organic fruits (0-1) ¹ Deklaracja zapłaty wyż- szej ceny za owoce eko- logiczne (0-1) ¹	A	-0.10*	-0.06	0.09	0.14***	0.01	0.01
	B	0.09*	0.03	0.08	0.02	0.09*	-0.01

¹0 – no indication, 1 – indication.

Significance of correlations at: * $\alpha < 0.05$, ** $\alpha < 0.01$, *** $\alpha < 0.001$.

Source: own research.

¹0 – brak wskazania, 1 – wskazanie.

Istotność współzależności dla: * $\alpha < 0,05$, ** $\alpha < 0,01$, *** $\alpha < 0,001$.

Źródło: badania własne.

Table 3. Interest in the method of production during shopping and declaration of paying higher price for organic fruit according to income per person (indications in per cent)

Tabela 3. Zainteresowanie metodą produkcji w czasie zakupu i deklaracja zapłaty wyższej ceny za owoce ekologiczne w zależności od dochodów na osobę (% wskazań)

Specification Wyszczególnienie	A – 2001 B – 2006	Total Ogółem	Till 300 PLN Do 300 zł	301-500 PLN 301-500 zł	501-1 000 PLN 501-1 000 zł	Over 1 000 PLN Powyżej 1 000 zł
Interest in the method of fruit production during shopping Zainteresowanie metodą produkcji podczas zakupu	A	35.7	40.8	32.0	37.8	32.2
	B	34.6	33.3	33.7	37.5	38.2
Declaration of higher price payment for organic fruits Deklaracja zapłaty wyższej ceny za owoce ekologiczne	A	48.9	53.1	44.1	50.4	49.2
	B	64.3	75.0	50.6	65.1	71.2

Source: own research.

Źródło: badania własne.

Besides, it follows from Table 3 that in 2006 – as compared to 2001 – the percentage of people interested in the method of fruit production increased together with increased incomes per person in the family; however, this relation was not statistically significant.

The relation of demographic and socio-economic features of the consumers and their interest in the production method while buying fruit in 2006 was described by means of the model of multiple linear regressions after estimation took the following form:

$$\text{Interest in the manner of fruit production during the purchase} = 0.191 + 0.108 \cdot \text{sex}$$

The above relation means that the consumers' interest in the method of fruit production increases with passing from the female to the male group by 0.108 points in the scale from 0 to 1.

It follows from Table 2 that the declaration to pay a higher price for organic fruit is correlated with the consumers' sex; besides, in 2006 this correlation was not too strong with the respondents' incomes (in 2001 this relation was significant in relation to the family type).

Table 3 presents indications in %, depending on the incomes. Declarations to pay a higher price for organic fruit were more frequent together with increased incomes. They were also very high in the poorest income group. This can be an expression of the wish to improve one's situation in the sphere of satisfying the needs of a higher rank because, after all, in comparison with real expenditures such a declaration costs nothing. Greater willingness to pay a higher price for organic food (more than 50% of indications) was declared by the consumers in the studies by Bartnik and Moroz [Szołtysek 2004]. It follows from the studies conducted by Smółczyńska [2002] among the inhabitants of Warsaw in 2001 that fewer respondents would pay for organic fruit as compared to Lublin. In Wrocław there were 50% of such people, and in the Małopolska district 71% [Kurzawiński 2001, Linczar-Małańczuk et al. 2001].

The relations existing in the years 2001 and 2006 were described by means of multiple linear regressions, which took the following equations after estimation:

$$\text{Declaration to pay a higher price for organic fruit in 2001} = 0.345 + 0.038 \cdot \text{family type}$$

$$\text{Declaration to pay a higher price for organic fruit in 2006} = 0.510 + 0.096 \cdot \text{sex}$$

It follows from the above equations that changing the family type by one level in 2001 caused more declarations to pay a higher price for organic fruit by 0.038 point in the scale from 0 to 1, while in 2006 passing from the female to the male group caused more declarations by 0.096 point.

Chi-square and V-Cramer statistics were used to find out whether there was significant changeability of preferences in the studied period in the sphere of interest in the production method while buying fruit and the declaration to pay a higher price for organic fruit. The value of both statistics and the value of probability are presented in Table 4. It follows from these data that with the level of significance $\alpha < 0.05$, interest in the method of production while buying fruit was not dependent on the date of studies, whereas the declaration to pay a higher price for organic fruit significantly differed in the studied years. Hence, in this case one can speak of changed preferences in the years 2001 and 2006 towards significantly increased acceptance of the organic method of fruit production.

Table 4. Value of Chi-Square statistics and Cramer's V and p-value for variables describing the preferences for examined features in the years 2001 and 2006

Tabela 4. Wartość statystyk chi-kwadrat i V-Cramera oraz wartość prawdopodobieństwa dla zmiennych określających preferencje w zakresie badanych cech w latach 2001 i 2006

Variable Zmienna	Chi-Square statistics Statystyka chi-kwadrat	P-value Prawdopodobieństwo	Cramer's V Statystyka V-Cramera
Interest in method of fruit production during shopping (0-1) ¹ Zainteresowanie metodą produkcji podczas zakupu (0-1) ¹	0.1124	0.7374	0.0117
Declaration to pay a higher price for organic fruits (0-1) ¹ Deklaracja zapłaty wyższej ceny za owoce ekologiczne (0-1) ¹	18.2374	< 0.0001	0.1552

¹0 – no indication, 1 – indication.

Source: own research.

¹0 – brak wskazania, 1 – wskazanie.

Źródło: badania własne.

CONCLUSIONS

1. An increase of the consumers' incomes was connected with a greater acceptance of the organic method, and a decrease of those incomes was related to greater frequency of indicating the traditional method. The reasons for choosing the organic method were not significantly related to the consumers' features. Consumers prefer organic fruit above all because, in their opinion, they do not contain harmful remains of the chemicals from spraying and fertilizers, and they have better health values.

2. Interest in the production method during the purchase of fruit is significantly correlated to the consumers' sex and it is higher among men as compared to women.

3. The declaration to pay a higher price for organic fruit is correlated to the consumers' sex; besides, in 2006 it was not too strongly related to the incomes.

4. The studies showed no change in the interest in the production method during the purchase among the studied group of consumers in Lublin, while pointing to changeability of preferences concerning the declaration to pay a higher price for organic fruit in the years 2001 and 2006.

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ZMIENNOŚĆ PREFERENCJI KONSUMENTÓW W ZAKRESIE METOD PRODUKCJI OWOCÓW

Streszczenie. Celem pracy było określenie i porównanie preferencji konsumentów dotyczących metody produkcji owoców (konwencjonalnej lub ekologicznej) w latach 2001, 2003 i 2006 oraz związków pomiędzy preferencjami a cechami społeczno-ekonomicznymi i demograficznymi konsumentów. Analizę wykonano na podstawie danych z badań ankietowych, przeprowadzonych wśród mieszkańców Lublina. Wyniki badań wskazują na to, że niektóre cechy konsumentów, jak płeć, dochody i typ rodziny, istotnie różnicowały preferencje w zakresie wyboru technologii produkcji owoców. Wzrost dochodów wiązał się z większą akceptacją metody ekologicznej, a ich spadek z większą częstotliwością wskazań na metodę konwencjonalną. Zainteresowanie metodą produkcji podczas zakupu owoców było istotnie wyższe wśród mężczyzn niż kobiet. Deklaracja zapłaty wyższej ceny za owoce ekologiczne była także współzależna z płcią konsumentów, a ponadto w 2006 roku – niezbyt silnie związana z dochodami ankietowanych. W latach 2001 i 2006 wykazano zmienność preferencji w zakresie deklaracji zapłaty wyższej ceny za owoce ekologiczne, a niemienną zainteresowania technologią produkcji owoców podczas zakupów.

Słowa kluczowe: owoce, preferencje, technologia, produkcja ekologiczna

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