

## Consumers' Interests in Sweets with Health-Promoting Properties and Their Selected Determinants

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The aim of the study was to examine to what degree the consumers' attitudes towards food and health influence their interest in sweets with special health-promoting properties, and to evaluate the effect of age, gender, education and family income on the interest in this kind of sweets. The research was carried out on a representative sample of 1000 adult Polish consumers. The survey instrument consisted of questions assessing consumers' interest in sweets, their preferences and attitudes towards sweets, paying attention to sweets labeled as having specific nutritional properties, and acceptance of additional ingredients aimed at improving health properties of sweets.

The research revealed that over half of the population declared no interest in new chocolate-coated products with special health properties. Moreover, almost 4/5 of respondents did not pay attention to or buy any sweets labeled as having specific nutritional properties. The most accepted components improving health properties of sweets were vitamins, then fibre and minerals. The declared sweetness preferences did not show any statistically significant correlation with the consumers' interest in sweets with health-promoting properties. Significantly higher number of respondents who did not use food as a reward and who could not formulate their opinions on health effect of sweets, declared attention paid to sweets labeled as having health-promoting properties or purchase of these products.

### INTRODUCTION

Functional food, according to the definition worked out within the FuFoSE project, is a food which together with the basic nutritional impact has beneficial effects on one or more functions of the human organism thus either improving the general and physical conditions or/and decreasing the risk of the development of diseases. Such food should look like conventional food and should have a favourable effect in the amount expected to be normally consumed with the diet [Diplock *et al.*, 1999].

Functional food differs from conventional food but it is also viewed as being member of the particular category to which it belongs, rather than being considered as a homogeneous group of products. Although the sweets with the increased health-promoting value do not have to be categorised as functional food, they can be viewed by consumers as such food. Moreover, they arouse a lot of controversy mostly because of many negative consequences to health caused by the consumption of conventional sweets. The food advertisement in mass-media, *i.e.* presenting candies with added vitamins, is also one of the important reasons of this controversy, especially when they are directed to the children [Halford *et al.*, 2004].

The Polish market of functional food products is growing constantly and the future of this type of food looks quite optimistic. The most dynamic development is observed in the group of soft drinks, cereal and milk products, fats and food for children. The development of the functional food market is caused by the growing health awareness, and the changes in consumer's attitudes towards food and health [Jeżewska-Zychowicz & Pilska, 2007; Thomson *et al.*, 2010]. The consumers' beliefs and preferences influence the declared willingness to buy healthy products and the purchasing behaviours [Bäckström *et al.*, 2004; Cox *et al.*, 2004; Urala & Lähteenmäki, 2007; Ares *et al.*, 2010]. The benefits which a person connects with the consumption of food usually accompany more positive feelings and *vice versa*. A person may at the same time represent both positive and negative opinions and preferences towards the food product [Conner & Sparks, 2002], which also takes place in the case of chocolate and other sweets [Wansink *et al.*, 2003; Rodriguez *et al.*, 2005; Macht & Dettmer, 2006; Macht & Mueller, 2007]. Moreover, negative beliefs may be accompanied by positive emotions and *vice versa* [Conner & Sparks, 2002; Berndsen & Van Der Pligt, 2004; Fletcher *et al.*, 2007].

The aim of this research was to assess to what degree the consumers' attitudes towards food and health relationship influence their interest in sweets with special health-promoting properties. The attitudes were represented by consumers' beliefs on the effect of sweets on health (cognitive component), and by the emotional component of at-

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titude created by the sweet preferences and the use of food as a reward. The effect of age, gender, education and family income on consumers' interests in "healthy" sweets was taken into account as well.

## MATERIALS AND METHODS

The questionnaire survey was carried out in the autumn of 2010 within the randomised group of 1000 adult Polish consumers. The survey instrument consisted of questions that assessed paying attention to or buying sweets labeled as having specific nutritional properties, and consumers' attitudes toward sweets, including their sweet preferences, their beliefs on the impact of eating sweets on the health and using food as a reward.

The emotional component of the attitude towards food and health was evaluated by taking into account the use of food as a reward and the declared sweet preferences. The six statements selected from the scales of Roininen *et al.* [1999] describing the use of food as a reward were evaluated on a 7-point Likert scale (1 = completely disagree, 7 = completely agree). These statements were as follows: "I reward myself by buying something really tasty", "When I am feeling down I want to treat myself with something really delicious", "I avoid rewarding myself with food" (these negative statement was recoded for the final score), "I believe that food should always be source of pleasure", "When I eat, I concentrate on enjoying taste of food", and "An essential part of my weekend is eating delicious food". The use of food as a reward was determined as the sum of ranks from the 7-point scale for the 6 statements (from 6 to 42 points), then the point intervals were determined based on the quartile analysis (20, 24 and 27 points). The first quartile was represented by people who did not use food as a reward (29.1%) – the sum of ranks was small, which can be interpreted as a relatively high level of disagreement with the statements, the second and third quartiles were represented by people using food as a reward but to some extent (43.4%), and the fourth group included people who often used food as a reward (27.5%) – the sum of ranks was high, which can be interpreted as a relatively high level of agreement with the statements.

Five-point scales were used for the assessment of consumers' preferences, (1 = I do not like; 5 = I like it very much)

in relation to 10 sweet assortments: chocolate bars; cream-filled chocolate; plain chocolate; milk chocolate without any additions or with the addition of fruit filling or filling other than fruit; toffi sweets; caramel drops or similar ones; cookies and wafers. Factor analysis was used for grouping the preferences. Kaiser-Meyer-Olkin and Bartlett's tests were used for testing suitability of the correlation matrix for factor analysis. Two factors explained 61.8% of the total variance. The first factor was represented by preferences towards cream-filled chocolate (correlation coefficient 0.832), milk chocolate with additions (0.765), chocolate-coated sweets with fruit filling (0.799) or other filling (0.801); while the other factor included preferences regarding cookies (0.884) and wafers (0.891). An agglomerative hierarchical cluster analysis based on these factors was carried out to identify segments of consumers with different preferences. Three homogenous clusters were identified, cluster 1 was described as "liking sweets" (48.0% of population), cluster 2 as "neutral" (36.4%), and cluster 3 as "disliking sweets" (15.6%) (Table 1).

The cognitive component of attitude towards sweets was evaluated using a question about the effect of consuming chocolate-coated products on the health. The answers were as follows: positive effect, no effect, negative effect, I do not know.

Statistical package SPSS 14 PL for Windows was used for the analyses including frequency analyses, cross tables, factor analyses and cluster analyses. Pearson's chi-square association test was used to confirm differences between variables at 0.05 probability level. One Way ANOVA and Tukey's test were used to confirm differences between variables measured as mean values.

## RESULTS AND DISCUSSION

As shown in Table 2, clusters significantly differed in their age, education and family income distribution. The homogenous clusters created according to the declared preferences of sweets distinguished themselves by the socio-demographic characteristics. Only gender showed no statistically significant correlation with sweet preferences. In other surveys a relationship between sweet preferences and gender was demonstrated, namely: women like chocolate more than men do [Wansink *et al.*, 2003; Osman & Sobal, 2006], and women more

TABLE 1. Respondents' preferences towards selected types of sweets according to their affiliation to the clusters (mean value of consumers' preferences calculated on the base of ranks from the 5-point scale (1 – I don't like, 2 – I rather don't like, 3 – neither like nor dislike, 4 – I rather like, 5 – I like very much)  $\pm$  standard deviation).

Types of sweets	Total n=1000	Cluster		
		"liking sweets" n=480	"neutral" n=364	"disliking sweets" n=156
Cream-filled chocolate (IS)*	3.42 $\pm$ 1.27	4.32 <sup>a</sup> $\pm$ 0.57	3.05 <sup>b</sup> $\pm$ 1.00	1.56 <sup>c</sup> $\pm$ 0.87
Milk chocolate with additional ingredients (IS)	3.50 $\pm$ 1.21	4.25 <sup>a</sup> $\pm$ 0.64	3.28 <sup>b</sup> $\pm$ 0.95	1.68 <sup>c</sup> $\pm$ 0.91
Chocolate-coated sweets with fruit filling (IS)	3.17 $\pm$ 1.26	4.12 <sup>a</sup> $\pm$ 0.66	2.64 <sup>b</sup> $\pm$ 0.90	1.52 <sup>c</sup> $\pm$ 0.90
Chocolate-coated sweets with non-fruit filling (IS)	3.37 $\pm$ 1.19	4.18 <sup>a</sup> $\pm$ 0.59	3.08 <sup>b</sup> $\pm$ 0.89	1.56 <sup>c</sup> $\pm$ 0.89
Cookies (IS)	3.74 $\pm$ 1.06	4.20 <sup>a</sup> $\pm$ 0.66	3.66 <sup>b</sup> $\pm$ 0.89	2.54 <sup>c</sup> $\pm$ 1.38
Wafers (IS)	3.64 $\pm$ 1.11	4.15 <sup>a</sup> $\pm$ 0.70	3.52 <sup>b</sup> $\pm$ 0.97	2.42 <sup>c</sup> $\pm$ 1.36

\*(IS) means with different superscripts differ significantly according to Tukey's test at  $p < 0.001$ .

TABLE 2. Components of the attitude toward sweets according to socio-demographic characteristics of the population (% of respondents).

Socio-demographic features		Total	Sweet preferences – emotional component of attitude			Food as reward – emotional component of attitude			Opinion on health effect of chocolate coated products – cognitive component of attitude			
			1 <sup>S</sup>	2	3	1 <sup>F</sup>	2	3	1 <sup>H</sup>	2	3	4
Gender (F, H)*	Women	53.0	54.8	51.1	51.9	57.4	47.5	57.1	62.4	47.4	47.8	46.8
	Men	47.0	45.2	48.9	48.1	42.6	52.5	42.9	37.6	52.6	52.2	53.2
Age (S, F)	18–24 years	22.5	25.2	22.8	13.5	20.6	20.7	27.3	20.9	23.0	25.0	23.1
	25–34 years	16.5	17.3	16.2	14.7	17.5	15.7	16.7	17.5	15.2	19.1	14.8
	35–44 years	20.9	22.1	21.4	16.0	18.9	19.6	25.1	20.6	22.2	16.2	22.7
	45–54 years	19.5	17.5	20.6	23.1	20.6	20.3	17.1	20.9	28.5	16.2	20.4
	55 years and over	20.6	17.9	19.0	32.7	22.3	23.7	13.8	20.1	21.1	23.5	19.0
Education (S)	Lower than secondary	25.2	23.1	21.2	41.0	22.7	27.0	25.1	23.8	25.9	25.0	26.9
	Secondary	45.3	48.8	46.7	31.4	43.6	46.3	45.5	45.0	45.2	40.4	49.0
	Higher than secondary	29.5	28.1	32.1	27.6	33.7	26.7	29.4	31.2	28.9	34.6	24.1
Opinions on family income (S)	Allows to fulfill basic needs or is insufficient	22.6	19.9	21.8	32.7	25.1	21.8	21.1	21.3	23.0	23.0	24.1
	Allows to fulfill some but not all needs	53.3	56.5	51.0	49.4	53.6	53.8	52.4	54.5	54.8	54.8	48.6
	Enough for all needs and some for saving	24.1	23.6	27.3	17.9	21.3	24.4	26.5	24.2	22.2	22.2	27.3

<sup>S</sup> 1 – “liking sweets”; 2 – “neutral”; 3 – “disliking sweets”; <sup>F</sup> 1 – use of food as a reward; 2 – seldom use of food as a reward; 3 – no use of food as a reward; <sup>H</sup> 1 – beneficial health effect; 2 – no health effect; 3 – negative health effect; 4 – I do not know.

\*statistically significant differences at  $p < 0.05$  (Chi<sup>2</sup> test) after considering: (S) sweet preferences; (F) use of food as a reward; (H) opinion on the health effect of consuming chocolate coated products.

often feel discomfort connected with having the sense of guilt after consuming it [Cartwright & Stritzke, 2008]. The cluster named “liking sweets” was represented by significantly more consumers aged 18–44 years, especially those of the youngest age group. Similar results were observed elsewhere [Wansink *et al.*, 2003; Cartwright *et al.*, 2007]. A higher number of respondents aged 45 years and more, as compared to others, represented the cluster described as “disliking sweets” and respondents from the oldest age group constituted nearly 1/3 of that cluster (Table 2).

A higher number of the surveyed with lower than secondary education represented the cluster “disliking sweets” and the remaining clusters were represented by a higher number of respondents with secondary education. Respondents with higher education less numerously represented clusters of “liking” and “disliking sweets” as compared with cluster 2 represented by the surveyed who were “neutral towards sweets”. Those liking sweets constituted the highest percentage of respondents declaring that “they can afford some but not all expenses”. The respondents who most positively assessed their family income constituted relatively the highest percentage in the cluster 2 (Table 2).

Opinions concerning rewarding with food significantly differed after taking the gender and age of respondents into account. Among consumers who declared the use of food as a reward, there were more women (57.4%) than men (42.6%), which confirms findings of other researchers [Kampov-Polevoy *et al.*, 2006] and more consumers aged 55 and over as compared with the remaining groups. More women than men, and more respondents at the youngest age and these aged 35–44 years than other consumers did not use food as reward. The gender was the only factor significantly differ-

entiating consumers' beliefs on the effect of chocolate-coated products on human health. More women than men indicated the benefits from consuming such products (Table 2).

Over half of the population declared no interest in new chocolate-coated products with special health-promoting properties. Only 13.4% of the respondents stated explicitly the interest in those products. The interest was expressed by a statistically higher number of respondents using food as a reward and positively assessing the effect of sweets on health. Well-known traditional sweet products were preferred by consumers who did not like sweets, those who used food as a reward and those who did not know how to express their opinions on the effect of these products on health (the answer “I do not know”) – Table 3.

According to the respondents' opinions, the most accepted component improving the health-promoting properties of sweets were vitamins, which were mentioned by over 70% of the population. Over 2/5 of the investigated group represented the opinion that fibre and minerals could be added in order to improve the health-promoting properties of sweets and less than one fourth of the respondents accepted organic ingredients in sweets. Fibre and vitamins were perceived as additional health-benefiting components in the case of other products, *i.e.* yoghurts [Kozłowska *et al.*, 2007]. Pro-biotic bacteria were accepted by only about 28% of the respondents. There are investigations confirming the lack of the positive effect of such bacteria added to the chocolate mousse on the consumers' acceptance of such product as compared with its conventional equivalent [Aragon-Alegro *et al.*, 2007]. Respondents' opinions did not differ in a statistically significant way after considering the component of the attitude towards food and health, with the exception of the use of fibre.

The acceptance of fibre as an addition to sweets was declared by a statistically higher number of respondents liking sweets, both confirming and not confirming the use of food as a reward, by consumers indicating a positive effect of sweets on health. In the case of pro-biotic bacteria and organic ingredients used as additives in the production of sweets, statistically significant correlations were achieved in the case of the opinions on the effect of the chocolate-coated products on health. More respondents showing a positive effect accepted those ingredients. Also among those who did not know how to assess these effects the percentage of respondents accepting organic ingredients in the production of sweets was relatively high (Table 3).

The low interest in sweets with an increased nutritional value was confirmed by the declaration concerning respondents' behaviours on the market during the last month, which included buying or only paying attention to sweets with special health-promoting properties declared by the producer. About 4/5 of the population did not exhibit any interest in these products in the form of behaviours. The declared sweet preferences did not show any statistically significant correlation with the interest in sweets with special health-promoting properties. Significantly more consumers who did use food as a reward and those who indicated negative impact of eating conventional sweets on health declared paying attention or buying sweets with the increased health-promoting properties. Investigations by Urala & Lähteenmäki [2007] indicate that noticing the reward as the effect of consuming functional food is an essential factor facilitating the willingness to buy such food.

On the other hand, the views concerning benefits from consuming functional food comprise an important factor determining its acceptance [Verbeke, 2005; Devcich *et al.*, 2007].

## CONCLUSIONS

This study showed that Polish consumers of sweets belonged to the traditionalists. Only to a small degree were they interested in sweets with special health-promoting properties, that are introduced by producers on the Polish market. Only the use of vitamins was accepted by the majority of consumers as desirable ingredients in such type of products.

Consumers' interest in sweets with special health-promoting properties showed the statistically significant correlations with using food as a reward and their beliefs on the health effect of consuming chocolate-coated product. More respondents using food as a reward and negatively assessing the effect of conventional sweets on human health were active on the market because they were paying attention to or buying sweets with labels "having special health-promoting properties" last month.

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TABLE 3. Consumers' opinions on new chocolate-coated products considering the cognitive and emotional components of the attitude toward sweets (% of respondents).

Socio-demographic features		Total	Sweet preferences – emotional component of attitude			Food as reward – emotional component of attitude			Opinion on health effect of chocolate coated products – cognitive component of attitude			
			1 <sup>S</sup>	2	3	1 <sup>F</sup>	2	3	1 <sup>H</sup>	2	3	4
I pay attention to new chocolate coated products labeled as having specific nutritional properties (S, F, H)*	Yes, I am interested	13.4	13.1	13.7	13.5	18.2	9.4	14.5	15.9	13.3	9.6	11.6
	Yes, but only from time to time	34.8	37.1	37.6	21.2	29.6	37.3	36.4	35.2	31.9	46.3	30.6
	No, I prefer well known products	51.8	49.8	48.6	65.4	52.2	53.2	49.1	48.9	54.8	44.1	57.9
In order to improve the health properties of sweets the following may be added:	Fibre (S, F, H)	45.4	50.2	40.7	41.7	51.2	38.5	50.2	59.3	43.0	33.1	31.9
	Minerals	71.5	75.0	68.1	68.6	68.7	74.0	70.5	71.7	71.5	66.2	74.5
	Vitamins	42.8	43.3	42.9	41.0	39.9	45.4	41.8	43.4	43.0	46.3	39.4
	Probiotic bacteria (H)	28.1	31.0	23.6	29.5	30.6	27.2	26.9	32.8	28.9	21.3	23.1
	Organic raw materials (H)	23.2	24.8	22.0	21.2	24.4	21.4	24.7	27.8	19.3	16.9	24.1
Last month I paid attention to or bought sweets labeled as having specific nutritional properties (F, H)	No I didn't	79.1	80.2	76.1	82.7	77.7	78.1	82.2	78.6	78.5	69.9	86.6
	Yes, but only chocolate products	7.3	8.1	7.7	3.8	5.2	9.4	6.2	7.1	6.7	14.7	3.7
	Yes, but only cookies and wafers	7.5	5.4	10.2	7.7	8.2	8.5	5.1	6.1	9.3	11.0	5.6
	Yes, I bought such products	6.1	6.3	6.0	5.8	8.9	3.9	6.5	8.2	5.6	4.4	4.1

<sup>S</sup> 1 – "liking sweets"; 2 – "neutral"; 3 – "disliking sweets"; <sup>F</sup> 1 – use of food as a reward; 2 – seldom use of food as a reward; 3 – no use of food as a reward; <sup>H</sup> 1 – beneficial health effect; 2 – no health effect; 3 – negative health effect; 4 – I do not know.

\*statistically significant differences at  $p < 0.05$  (Chi<sup>2</sup> test) after considering: (S) sweet preferences; (F) use of food as a reward; (H) opinion on the health effect of consuming chocolate coated products.

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