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Consumer attitudes to genetically modified foods – results of a nationwide study

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Abstract. Consumers today are becoming increasingly conscious and would like to make decisions in matters of shopping based on information they have collected. Secondary research has clearly shown that Hungarian customers reject GM foods. We used questionnaires in our primary research with 500 respondents. We analysed the first 13 from the 28 questions. More than 93% of the respondents had heard something about GM foods. They collect information mostly from television, newspapers and magazines are on the second place, Internet and radio on the third and fourth, respectively. When they hear the term 'genetically modified', they mainly think of an unnatural, unhealthy, and dangerous food product. Their impressions are definitely negative. A quarter of the respondents believe that GM technology has been used in human medicine for only a couple of years. They reject genetic modification entirely, especially in animals. It is crucially important to complement the missing facts, rectify incorrect information and publish scientific results so that consumers are well-informed, enough to be able to make a justified decision whether or not to buy GM food products.

1 Introduction

Research shows that the role of nutrition in human health is significant (*Berke*, 2004). Consumers are more and more aware of this fact; they are looking

Key words and phrases: genetically modified food, consumer attitudes.

for products which contribute to sustaining their health. Thus, we can say that today's consumers are becoming increasingly conscious and would like to make decisions in matters of shopping based on information they have collected. They are searching for manufacturers and products that they assume to be authentic; they are not willing to compromise in that (*Szakály*, 2008). This relates to genetically modified (GM) products, too. Secondary research has clearly shown that Hungarian customers reject transgenic foods. For example, according to the survey conducted by KÉKI (2002), 56% of the Hungarian consumers consider the general use of GM technology as harmful; among them, 30% consider it as very harmful (*Vajda*, 2005). According to results by Capital Research Institute, 62% of the consumers are afraid of the sale and consumption of GM foods. Today's conscious customers have the expectations connected to GM foods that they must not be harmful for their health but should have a positive influence on it. They feel it is important that scientists ease consumers' anxiety and that consumers can get enough information; for example, they would like to know about research results. More significantly, it is important for them to be able to make a choice between GM and conventional food products (*Bánáti*, 1999; *Szeitzné*, 2003).

Transgenic plants and food products with such ingredients are largely relevant today. It is a significant current issue nowadays characterized by a large amount of extreme and completely contradictory opinions and information. These products are available on the shelves of Hungarian shops (*Őri*, 2008; *Balogh et al.*, 2008); what is more, there have been food scandals connected to them, such as the GM rice found in Hungary. The important question is whether consumers have sufficient information in connection with these products. Besides, it is crucial whether they are able to make heads or tails of the large amount of contradictory views and information.

Therefore, our aim was to find out if consumers had heard anything about GM foods, and if they had, how much information they had, how authentic this information was, and what impression they had of these products.

2 Material and method

In our primary research, we used questionnaires with 500 respondents. Our research is nationally representative by age, gender, and region. The sample quota was taken on the basis of the 2001 census data of the Statistical Office. We selected the settlements randomly, but we were careful that at least one settlement per region was selected. The respondents were selected with

random-walk method based on the quota. The questionnaires were administered by students, PhD students, and teachers of universities and colleges in the selected towns. Respondents were anonymous and voluntary. The questionnaire listed closed-ended questions with one exception.

In the first half of the questionnaire, we enquired about the respondents' knowledge, information about and attitudes to GM foods. Then we asked about their willingness of consuming GM foods and their expectations in this respect.

This article publishes parts of our results. It analyses the first 13 questions of the total 28 found in the questionnaire.

The collected data were evaluated with SPSS 13. We calculated frequency distributions and means and carried out chi-squared tests. We examined the relationship between the different variables and background variables with the help of cross tables.

3 Result and evaluation

More than 93% of our respondents have heard something about GM foods. We will analyse their answers below. The number of respondents answering yes grew significantly with qualification. The same tendency was characteristic with monthly net average income per capita per household. Also, our results were significant by age; those who did not know anything about GM foods were primarily over 50 years of age.

Figure 1 shows where most respondents have heard about GM plants.

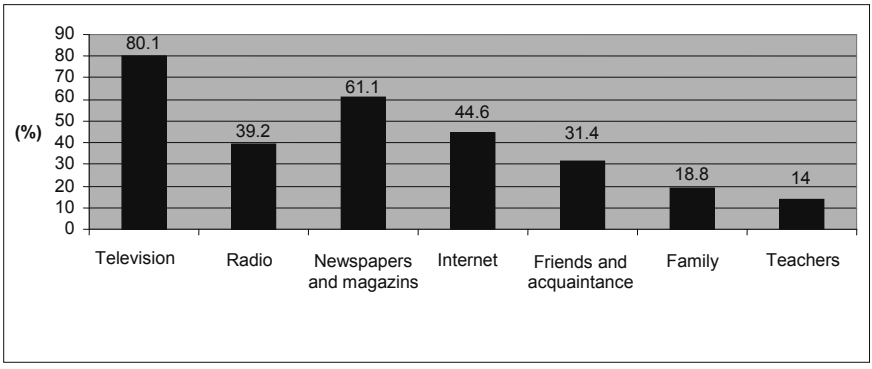

Figure 1: Consumers' source of information regarding GM foods (n=466) (%)

With regards to food products containing GM ingredients, most respondents collect information from television (80.1% mentioned it). With the development of communication technology, more and more channels are available for consumers. However, the primary source of information is still the television. This is shown by other researches, too, such as the study of Zoltán Szakály and his colleagues in 2008 (*Berke*, 2010), or the 2011 *Sonda Ipsos* research. Newspapers and magazines (61.1% mentioned them) are on the second place, the Internet on the third (44.6%), and the radio is on the fourth with slightly lower results: 39.2% (Figure 1). Women rather collect information from television (81.1% mentioned it), men collect information mostly from television (79.5% mentioned it), newspapers, and magazines (63.3% mentioned it), but many of them also indicated radio as a source of information. The higher their qualification was the more often they mentioned the radio, too. A lot of respondents collect information from the Internet, primarily those in their twenties and the middle-aged respondents. The number of respondents mentioning the Internet grows with higher qualification. Teachers' opinions might mean authentic information for students. Consequently, as television is the most preferred information source for consumers, it is this channel through which they should be provided with more information. For example, it would be important to broadcast professional debates and round-table discussions on this topic.

What comes to respondents' minds in connection with GM foods? Table 1 shows the most often mentioned associations.

Table 1: Impressions and associations in connection with GM foods (n=466).

What comes to your mind in connection with GM foods?

unnatural, artificial ♠
harmful (for health) ♠
corn, soy, potato, wheat . . . •
unhealthy ♠
dangerous ♠
interference with nature, against nature ♠
uncertainty, unpredictability ♠
money ♠
health ♦
science, development of technology ♦
biotechnology •

The following answers are on the first three places: transgenic food is unnatural and 'artificial' (10.7%), harmful (9.1%), unhealthy (6.3%), dangerous (6.3%), and against nature (4.4%). 8.8% of the respondents think of some GM plant when they hear the expression 'GM food', for example, corn, soy, potato, wheat. Corn and soy were mentioned primarily, which indeed belong to the most well-known and current GM plants. The reason for this is that – in addition to soy – we can hear mostly about corn in the news as it is the most widespread in the cultivation in the EU. Out of these corn types, MON810 is the most often mentioned, on which there has been a moratorium since 2005. Almost 100% of the soybeans sold in the market come from the American continent, where GM types are cultivated primarily. Other plants were also mentioned, such as tomato, which was the first GM plant (FalvrSavr tomato) on the market. Figure 2 shows that there are only negative associations with the exception of corn.

We wrote the words into the table in the order they were mentioned. Only the most often mentioned words were included in the table. The lines of the table were coloured on the basis of the colours used in Figure 2; namely, some of the words reflect positive (♦), negative (♠), or neutral (•) associations.

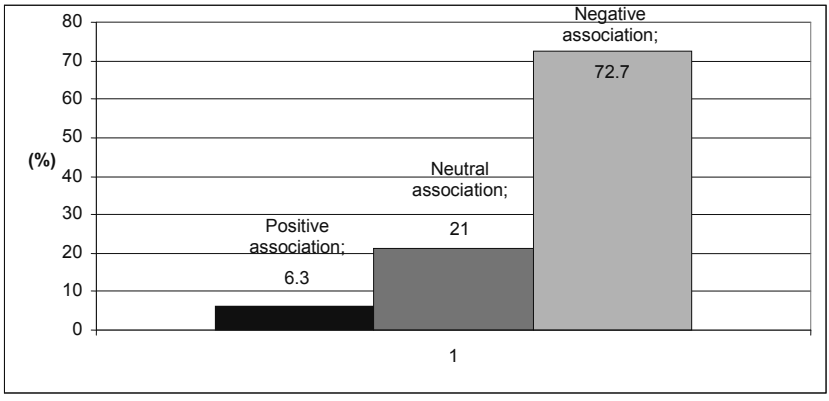

Figure 2: Associations in connection with GM foods (n=466)

The vast majority (72.7%) has negative associations in connection with GM foods; 21% has neutral associations; the latter mostly mentioned some plants or another word which was neither positive nor negative. 6.3% mentioned a positive word. With respect to the relationship between age and associations, we can say that respondents aged 18-29 had the most positive associations and respondents aged 50-59 had the most negative ones. By qualification, re-

spondents with primary school qualifications had the worst opinions. They are likely to have the smallest amount of information available about GM foods; this is why they reject them. Rejecting GM foods was more characteristic of families with children than young couples without children.

Respondents could choose several answers to the fourth question, namely, which GM plant they thought was cultivated on the largest area in the world (Figure 3).

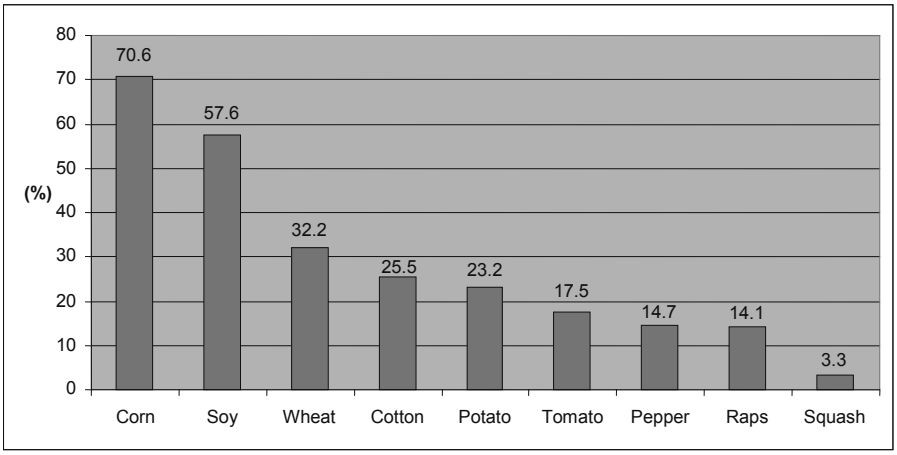

Figure 3: The GM plant cultivated on the largest area according to consumers (n=466) (%)

Most respondents chose corn (70.6%), soy is on the second place (57.6%), and wheat was often chosen, too (32.2%). Both men and women chose corn with more than 70%. The reason why it was so often mentioned is that this is the most often discussed topic in GMO news in Hungary. According to 2006 data, soy has the largest production area (58.6 million ha), corn has the second largest production area (25.2 million ha), cotton and rape are next with 13.4 million ha and 4.8 million ha, respectively (*Bánáti* and *Gelencsér*, 2007).

61.5% of the respondents said that GM foods are foods with ingredients that contain genes of another species, so they gave the correct answer. 21.9% of the respondents think that GM means a special manufacturing technology with which it is possible to keep the vitamin content of the food. The third answer, namely, that these foods contain a large amount of genes, was chosen by 7.2% of the respondents. The proportion of respondents giving wrong answers is still high (38.5%). With respect to the definition of the expression, the youngest

respondents are less informed and the respondents aged 50-59 are the most informed. Over 59 years of age, there is a decreasing tendency. The number of correct answers grows with qualification (except those with primary school qualification; this fact is probably due to the low number of respondents).

A significant proportion of the respondents (61.3%) suppose that genetic modification is used in human medicine, that is, in pharmaceutical industry. 25.3% of the consumers think that genetic modification has been used in pharmaceutical industry for only some years. Thus, in their opinion, this is an almost completely new method whereas it has been used in the pharmaceutical industry in addition to fermentation industry since the 1980s (*Bánáti* and *Gelencsér*, 2007). 25% of the respondents thought so (Figure 4).

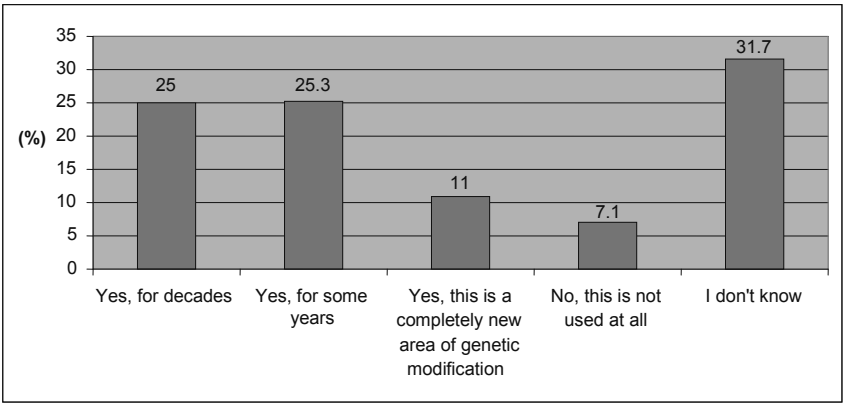

Figure 4: Consumers' opinion about the application of genetic modification in human medicine (n=465)

Table 2 shows that consumers cannot accept genetic modification at all. Most of all, they reject the genetic modification of animals.

Advocates of GM products often claim that such products might be a solution to the famine in the Third World. 51.4% of our respondents disagree with this argument; 81.9% would rather give them the unused cereals instead. They (56.6%) believe that only rich countries can profit from this; 22.3% think that also farmers can make a profit from the cultivation of such plants.

The majority (89.5%) agrees with the claim that until there is no sufficient scientific evidence regarding the safe consumption of such products, they should not be marketed. Considering, however, the opinion of respondents giving multiple answers (76.1%), the results show that they agree with the claim that research is still necessary in Hungary.

Table 2: The acceptability of genetic modification according to consumers (1 = strongly disagree, 5 = strongly agree)

	Mean	Standard deviation
The genetic modification of animals is unacceptable to me.	4.03	1.37
I cannot accept GM foods at all.	3.62	1.4
The genetic modification of plants is unacceptable to me.	3.74	1.36

According to 72.7% of the respondents, the spread of such plants endangers organic and conventional farming.

72.4% of the respondents think that the consumption of products containing GM ingredients might have unknown consequences.

4 Conclusions

The respondents are only partially informed about GM foods. Although some of them are trying to collect information, it is very difficult to digest this large amount of information as we tend to encounter a large number of contradictory views. Although conscious consumers are trying to make justified decisions, it is very difficult to stay realistic. Based on the information they have gained, and also emotionally, they have negative attitudes towards GM products. They consider them as artificial, unnatural, harmful for health, dangerous and risky. Consequently, consumers have no confidence in transgenic products.

There is a lot of distorted and incomplete information in different news items. It is the GM corn cultivated in the EU that is the best known. By contrast, soy is less often mentioned, although this is the GM plant that is most likely to be contained in foods in Hungary, too. The respondents cannot accept genetic modification, especially in animals. They trust scientific results; they would prefer to see scientific results as a preliminary condition of the distribution of such products. In addition, they fear that the spread of GM plants could endanger conventional and organic farming and they are also concerned about the environment. Nevertheless, they agree with the necessity of research.

It is a very important task to fill the information gaps, rectify the distorted information, and publish scientific results so that consumers are well-informed, enough to be able to make a justified decision whether or not to buy GM food products. Staff in shops should be knowledgeable about GM ingredients in particular products and consumers should be able to choose on this basis, too. Also, consumers should be able to understand the differences between the various products.

Thus, detailed and well-grounded marketing communication is essential in connection with genetic modification. Consumers' most important source of information is television; therefore, this channel should be exploited more for information; particularly, the scientific results should be published. In addition, it may be interesting to cover professional discussions and round-table talks. It would be worth editing a journal to be published twice a year which covers the most important news and results in this field. Schools (secondary and tertiary institutions) could get free copies while it would be available in other places, too. Thus, it could be a first step of informing and training teachers as they are an authentic source of information for their students.

There is a public revulsion against genetically modified products. A future study should examine consumers' expectations in this respect.

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