

## Consumer Attitude towards Labeling of Genetically Modified Foods in Sri Lanka

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**ABSTRACT.** *There has been a rapid expansion in the cultivation of genetically modified (GM) crops since its first commercialization in 1996, resulting in a rapid increase in GM food products. The abundance of GM foods in the market has resulted in a great concern over the health impacts of them on consumers. The worldwide consumer response towards GM food products has been mostly negative. The present research was carried out to study consumer attitude towards GM foods in Sri Lanka, and their labeling. This is the first report of a study conducted on GM food acceptance in Sri Lanka. Results revealed that most of the Sri Lankan consumers are not aware of GM foods and perceive GM foods as being risky to human health. The majority of the consumers were of the view that GM foods should be labeled. A significant negative relationship was found between identifying GM foods being risky to the health and buying GM food products. Many were interested to gain more knowledge on GM food products. Most consumers tend to read labels on food items, especially to verify the dates of manufacture, expiry etc., but rarely to check the ingredients. Although GM food labeling is mandatory in Sri Lanka, there are many important issues still to be addressed before fully implementing GM food labeling policies.*

**Keywords:** *Genetically modified (GM) crops, consumer attitude, labeling, health risk*

### INTRODUCTION

Genetically modified (GM) foods are developed and marketed due to some apparent advantage of these foods over the conventional food products. By genetic modification, it has been possible to create a food product with better shelf-life or nutritional value or both. The food products that have been developed from GM crops, such as, tomato, corn, soybean and potato are currently on the market. There are other non-plant based GM foods such as cheese and additives used in food industry, which have developed *via* GM microorganisms. The first GM crop, FlavrSavr tomato was commercialized in 1996. Since then, the worldwide adoption of GM crops expanded substantially. In 2008, worldwide GM crop cultivation attained to 125 million hectares in 25 countries with a world total of 13.3 million farmers using genetic engineering commercially (ISAAA 2008). Many studies have been carried out worldwide to investigate consumer attitude towards GM foods. Consumer surveys on acceptance of GM food have carried out in countries, such as, the USA, Norway and Taiwan (Chern *et al.*, 2002), Hungary (Banati & Szabo, 2006), United Kingdom (Burton *et al.*, 2001), Belgium (Verdume *et al.*, 2001), Germany (Spetsidis & Schamel, 2001) and

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Japan (Macer & Chen Ng, 2000; Chern *et al.*, 2002; McCluskey *et. al.*, 2003). However, there are no studies have been reported on Sri Lankan consumers' attitude towards GM foods.

Since GM foods are becoming so common in the market, labeling policies for GM foods are rapidly evolving worldwide, leaving the choice for the consumers to eat GM food or not. There are different policies existing in different countries with respect to labeling of GM foods. At least 21 countries and the European Union have established some form of mandatory labeling (Phillips & McNeill, 2000; Gruere & Rao, 2007,). Since Sri Lanka imports food items from countries, which GM products are available, there is ample room for imported food products from these countries to include GM material. The objective of this study is to identify Sri Lankan consumer perception on GM foods and their labeling and other related factors, such as, purchasing GM food, perception about health risks of GM food, reading labels and seeking more information on GM food.

## MATERIALS AND METHODS

A pre-tested questionnaire was used to collect information on GM food at two popular supermarkets in Kandy and Colombo in the months of July and August, 2010. Customers visiting certain supermarkets were selected since collecting data from consumers at the same time and place where the actual purchase decisions are made is vital to understand the consumers' true preferences about the products. Further, it was considered that the consumers visiting supermarkets are more informative on GM foods. A previous study has shown that the majority of the general consumers in Sri Lanka visiting normal markets have, in fact, not heard of GM food (unpublished data).

The questionnaire consisted of two parts. The first part examined the socio-economic background of the respondent, such as the gender and the education level. The second part composed of questions to find the respondents' attitude towards GM foods and their labeling. Further, the questionnaire examined whether the consumers are keen on obtaining more information on GM food. The survey data were collected by in-person interviews from the customers visiting the supermarkets, who were above 20 years of age. A probit analysis was carried out to identify the factors that are associated with the willingness to buy GM food. The following statistical model was specified to establish the relationship between the purchasing decision of GM food with respect to gender, education level, perceiving health risks of GM food and reading labels on food items.

Probit model  $Y = f(X_1, X_2, X_3, X_4)$

Where, Y= Purchasing decision of GM food;

X1= Gender

X3= Perception on risk

X2= Educational level

X4= Reading labels on food items

## RESULTS AND DISCUSSION

All customers visited the 2 supermarkets within a given time period were requested to answer the questionnaire, though some of the customers were not willing to participate in the survey. Twenty customers rejected answering the questionnaire. Some customers were willing to answer, but were not aware of GM foods, and therefore, it was necessary to

provide them some background information about GM foods. A total of 120 consumers were interviewed and each interview lasted between 5 to 10 minutes.

### Gender and education level

The majority of the respondents were females (65 %). Most of the respondents (43 %) had a secondary school education. There were 32 % degree-holders, 13 % diploma-holders and 10 % with professional qualifications. Only 3 % of the respondents had an education only at the primary level (Table 1).

As the majority of the consumers had a secondary school education, it is highly unlikely that they are well-informed on genetic modification. Genetic modification has been incorporated into the school curriculum of secondary education only in recent times. However, this subject was taught previously only at the tertiary level of education for students who study biological sciences. There were only about 30 % of the respondent who had a degree and, even among them, it was not known how many respondents have had a background in biology.

**Table 1. Socio-economic background of the consumers**

<b>Gender</b>	<b>Percentage (%)</b>
Male	35
Female	65
<b>Educational level</b>	
Primary	03
Secondary	42
Diploma	13
Degree	32
Professional	10

### Consumer perception about health risks of GM food and purchasing GM food

Sixty nine percent of the respondents were of the view that GM foods cause risks to health. Out of this, 23 % perceived that GM foods are highly risky to human health. Nine percent of the respondents did not perceive GM foods as risky. Out of this, 3 % of the consumers perceived GM foods as not risky to the health at all. There were 23 % of the respondents who were neutral on the subject (Table 2). Fifty seven percent of the respondents flatly refused buying GM food. Twenty seven percent were uncertain about what they would do, while 16 % of the respondents did not mind buying them (Table 2). Although 69 % perceive GM foods pose risk to health, only 57 % completely rejected buying GM food. Even though the rest of the respondents (12 %) who perceived GM food cause a health risk, they did not mind buying GM food.

In the worldwide situation, it was found that around 60 % for Norwegians and 54 % for the Americans believe GM foods as being risky to health, whereas, about 34 % of Norwegians and only 9 % Americans consider GM foods as extremely risky (Chern *et al.*, 2002). Nevertheless, 45 % of Americans think GM foods are safe for consumption (The Genetic Engineering Action Network, 2003).

**Table 2. Perception about health risks of GM food and buying of GM food**

<b>Risk to the health</b>	<b>Percentage (%)</b>
Very risky	23
Risky	46
Neutral	22
Not risky	06
Extremely not risky	03
<b>Buying GM food</b>	
Yes, buy	16
Do not buy	57
Not sure	27

### **Consumer attitude on importance of labeling GM foods and seeking more information on GM foods**

Ninety three percent of the consumers were of the view that labeling of GM foods is very important, while 7 % did not have any idea about the benefits of labeling GM foods (Table 3). It was shown that 94 % of Americans believe GM foods should be labeled (Chern *et al.*, 2002), but only about half of the respondents (54 %) said it would negatively affect their purchasing decision (The Genetic Engineering Action Network, 2003). In another study done in the USA with 437 supermarket shoppers, it was found that 78 % supported mandatory labeling of GM foods. However, the respondents were not willing to pay a premium price for such labeling (Loureiro & Hine, 2004). Further, for religious or ethical reasons, many Americans would like to avoid consume animal products, including animal DNA. Therefore, they are not in support of GM foods. Women favored mandatory labeling more than men, while younger consumers were less likely to support mandatory labeling. Those who considered themselves better informed about biotechnology were less concerned that GM foods be labeled (Loureiro & Hine, 2004). Majority (87 %) of the respondents were used to read labels on food items all the time, whereas 12 % revealed that they would read sometimes. Although 93 % of the respondents consider labeling is important (Table 3), only 12 % of the respondents read labels on food items all the time. The consumers read labels on food items mostly to verify the dates of manufacture, expiry etc. However, this is an important practice as it would provide the consumer the opportunity to accept or reject GM foods, if they were labeled.

Eighty percent of the respondents want to seek more information on GM foods, which implies that there is a scope for introducing the benefits of GM foods. This is an important aspect in marketing of imported food items, such as, corn flakes, soya bean oil etc. imported from GM crop-growing countries. Twelve percent of the respondents were not sure whether they would look for more information on GM foods, whereas, 5 % did not want to know further about GM foods (Table 3).

**Table 3. Attitude on GM food labeling and seeking more information on GM food**

<b>Reading the labels on food items</b>	<b>Percentage (%)</b>
Read labels	87
Do not read labels	01
Sometimes read	12
<b>Importance of labeling foods as GM non GM</b>	
Very important	93
Not important	0
No idea	07
<b>Seek more information on GM food</b>	
Yes	83
No	05
Not sure	12

#### **Factors contributing to the decision on purchasing GM food**

According to the probit analysis, there was a significant negative relationship between identifying a health risk of GM food and willingness to buy GM food (odds ratio = 2.29). However, the socio-economic factors, such as gender and educational level of the respondents did not play any significant role in purchasing decision of GM food. No significant relationship was found between reading labels on food items and willingness to buy GM food. This suggests that although the vast majority of the consumers believe GM food labeling is important, it does not influence their purchasing decision.

**Table 4. Coefficient estimates of the probit model for decision on purchasing GM food**

<b>Variable</b>	<b>Coefficient</b>	<b>Std Error</b>	<b>Probability (5%)</b>
Gender	-0.4712617	.3764262	0.211
Education level	0.0166747	.1838269	0.928
Perception of risk	-0.3908373**	.1838618	0.034
Reading labels	-0.3556646	.5130713	0.488
Constant	-1.818281	.9967283	0.068

Note: Number of observations =100; Log likelihood = -33.901; LR  $\chi^2$  (4)8.97; Prob >  $\chi^2$  = 0.0618; Pseudo R<sup>2</sup> = 0.116

\*\* Significant at 5 % level.

The willingness of the consumers to pay for the cost of labeling has not been considered in this study. Accurate labeling requires an extensive identity preservation system from farmer to food producer to retailer. Either testing or detailed record-keeping must be carried out at various steps along the food supply chain. Estimates of the costs of mandatory labeling vary up to 10 % of a consumers' food bill (Gruere & Rao, 2007) and the economic burden of labeling GM foods involves far more than one could expect.

### **CONCLUSIONS**

Most of the consumers in Sri Lanka are not aware of GM foods and the majority of them perceive GM foods as risky to human health. Many consumers completely refused buying GM food and some were uncertain whether they would buy GM food or not. A vast majority

of the consumers were of the view that GM food should be labeled, although many of them do not read labels on food items all the time. The probit analysis showed that perceiving health risks of GM food negatively affects the decision on purchasing GM food. However, there is no significant relationship between reading labels on food items and purchasing decision of GM food. Many respondents would like to seek more information on GM foods.

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