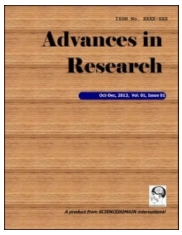

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Consumer Perception on Genetically Modified Food in Sri Lanka

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Authors' contributions

Both authors equally contributed to this study. Author RMUSKR designed the study. Author JWAS prepared the first draft of the questionnaire, wrote the first draft of the manuscript and managed the literature searches and data analysis. Author RMUSKR prepared the final version of the questionnaire and manuscript. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

The perception of the Sri Lankan public on Genetically Modified (GM) foods was examined by administrating a structured questionnaire to 800 selected respondents. Wide range of questions was included in the questionnaire and it was structured to have comprehensive idea about the understanding and perception of the respondents on genetically modified food. To ensure good representation of the public equal number of respondents were selected from academia, research scientists, university students and ordinary Sri Lankan. According to the results of the study, Average awareness of Sri Lankan public on GM food was 96%. Majority of respondents has received information about GM foods from TV & Radio. Compared to others, respondents from the academic and research institutes had higher knowledge on GM food. Highest level of interest on issues of Biotechnology and GM foods was shown by the academics which were followed by respondents from research institute and university students. However, ordinary Sri Lankan showed low interest. Seventy (70%) and sixty-three (63%) percent respondents from academic and research institutes respectively are willing to accept GM foods while twenty-one (21%) and twenty-five (25%) percent of university students and ordinary Sri Lankan respectively are willing to accept. The reason for rejecting of GM food of the majority of respondents was fear of side effects. According to the results of the study, there is a requirement for educational programmes on GM foods for Sri Lanka public. In

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those programmes special concern must be given to health risks/side effects. According to the results of the study, TV & radio programmes are the best method to improve the knowledge of Sri Lankan public on GM food.

Keywords: Genetically modified foods; public perception; consumer willingness.

1. INTRODUCTION

Food scarcity is one of the major global issues. A quantitative study which has been conducted by Food and Agriculture Organization (FAO) in 2012 revealed that, 870 million people in the world are suffering hunger [1]. This figure represents 12.5% of the global population or one in eight people in the world. According to the report an immediate solution is required for this people who are suffering hunger and which is a high percentage of global population. In South Asian context, 26.8% of the population was suffering hunger during 1990-92 and this figure only reduced to 17.6% in 2010-2012. The figure was clearly revealed that, reduction of suffering hunger percentage of total South Asian population during ten years of period is 9.2% and still significant population remaining with food scarcity. Major reasons behind this food scarcity are low crop yield, post-harvest loss and less nourished food. Research by the FAO shows that, to reduce poverty and hunger, the investment in agriculture is five times more effective than investment in any other sector [2]. Therefore, higher attention to improve nutritional quality and yield of crops with better shelf lives is required. Traditional crop improvement method for instance plant breeding is not sufficient in this regards [3]. Thus, there is a need of advance technologies to improve agricultural production. Amongst several other developing technologies Biotechnology is prominent. Here, Genetically Modified (GM) foods/crops play a major role. It is reported that many GM crop varieties have shown superiority over conventionally grown crops in terms of yield, pests, and disease resistance, nutritional quality and shelf life [1].

The GM foods have been popularizing globally during past decades. Most commonly used GM plant based food products are tomato, corn, soybean, and potato [4]. These GM plants have been engineered to resist pest and disease attacks and thereby reduce the yield loss due to those. However, still there is a doubt about their possible negative effects. Other non-plant based GM foods, animal food products such as cheese and food additives which are developed through GM microorganisms are also available. However, some of the countries have accepted GM foods while others have not accepted GM foods due to doubt of health risk. Due to this uncertainty, most of the counties have conducted research in order to get information on consumer attitudes toward GM foods. Ghana [5], the USA, Norway and Taiwan [6], Hungary [7], United Kingdom [8], Kenya [9], China [10], Germany [11] and Japan [12] are some of those countries.

As most of other developing countries, Sri Lanka also facing food scarcity and the food shortage of the country is fulfilled by imported food products from different countries. Most of those countries have been implementing GM techniques to their food crops. Therefore, food products with GM materials are available in the Sri Lankan market and subsequently, Sri Lankans are also consuming GM foods intentionally or unintentionally. Like in some other countries, some of the Sri Lankan also have negative attitude on health issues of GM foods [4]. As such, a study on the perception of Srilankan consumers towards GM foods is required. However, such study has not been conducted yet. Published data on Sri Lankan attitude on issues related to GM foods is also very limited; only the available study has been

conducted by Senerath and Karunagoda in 2012 which also mainly focused on Sri Lankan attitude towards labeling of GM foods. Therefore, in this study we investigated Sri Lankan attitude on GM food through detailed questionnaire survey by using 800 Sri Lankan respondents representing different segments of the Sri Lankan population.

2. MATERIALS AND METHODS

Four target groups were selected from the Sri Lankan adult population for this study. Those were academia, research scientists, university students and ordinary Sri Lankan. Two hundred people were selected from each group, from all over the country, which included hundred male and hundred female. Those were interviewed using a structured questionnaire during the period August to October 2013. The questionnaire was designed to collect data for set objectives which included level of willingness to use GM foods, perceptions of the usefulness of Biotechnology, level of interest for Biotechnology research and ways of improving the level of GM food acceptance among the Sri Lankan people. Fifty questions were included in the questionnaire to investigate the knowledge level and perception of the respondents on GM foods comprehensively.

There were four main sections in the questionnaire which covered demographic data, knowledge on GM foods, Perceived risks and willingness to buy and use GM foods and support for GM research and trust for government agencies to handle issues of GM foods. Hundred percent of questionnaires were administered and retrieved. The data collected by questionnaires were analyzed using Statistical package for social Sciences (SPSS) version 17 and Microsoft excel.

3. RESULTS AND DISCUSSION

All the selected respondents, from the four different categories including academia, research institutions, university students and ordinary Sri Lankan, were participated to the study. Different information extracted from the questionnaires on GM food such as awareness, source of information, level of knowledge and interest, willingness to accept and reasons for rejection are discussed below.

3.1 Awareness of Biotechnology and GM Foods

Respondents were asked whether they had heard about Biotechnology and Genetically Modified foods (GM foods). Hundred percent (100%) respondents from the academics and research institutions had heard about Biotechnology and GM foods. Also eighty-nine (89 %) and ninety-six (96%) percent of respondents from university students and ordinary Sri Lankan respectively mentioned that they had heard about Biotechnology and GM foods (Fig. 1).

These data clearly revealed that, all Sri Lankan without concerning their educational level had heard about GM foods and the average awareness was 96%. In similar studies carried out by other authors [5,9] has reported that the awareness of people in Ghana and Kenya are 89% and 38% respectively. So, the awareness of Sri Lankan on GM food is higher than that of those countries.

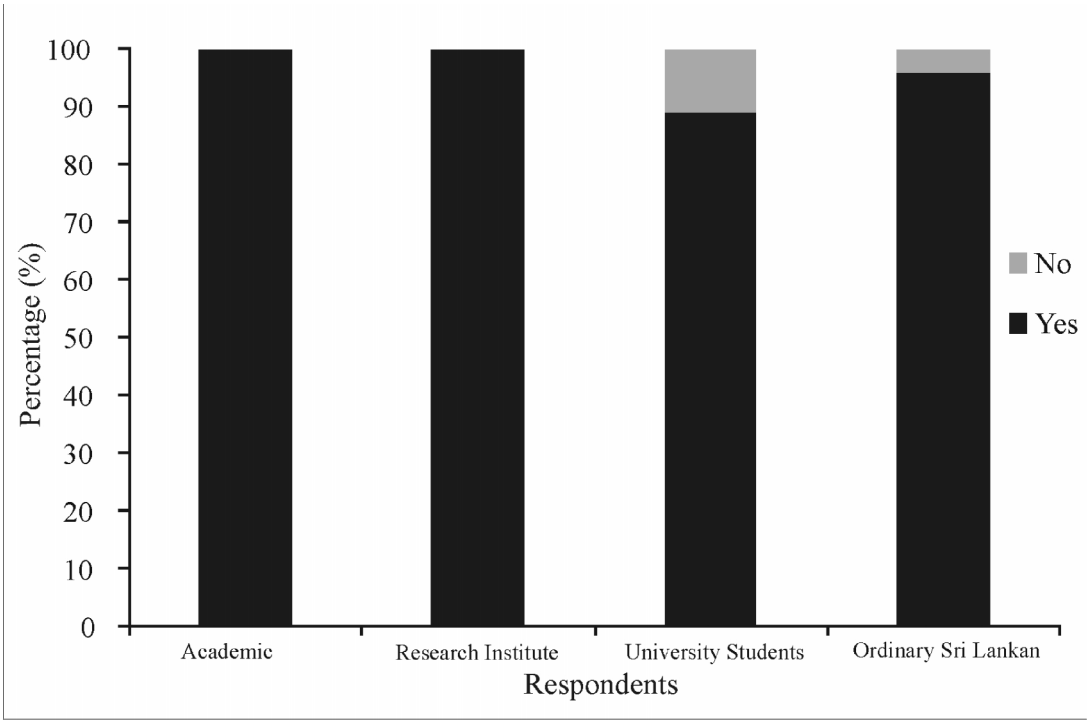

Fig. 1. Percentage of respondents who had heard about Biotechnology and GM foods

3.2 The Source of Information on Biotechnology and GM Foods

The information gathered on the source of information are shown in Fig. 2. TV & Radio were the source of information for the majority of respondents. Eighty percent (80%) of the university students, eighty percent (80%) ordinary Sri Lankan, fifty (50%) percent of academics and sixty (60%) percent of respondents from research institutes had received information on GM food from TV and radio. Work- shops were reported as the source of information only for twenty five percent (25%) respondents from academics and research institutes each. Ten (10%), twenty (20%) and twelve (12%) percent respondents from research institutes, university students and ordinary Sri Lankan respectively had heard about GM foods by printed media. Very few respondents as twenty-five, five and eight from academic, research institutes and ordinary Sri Lankan had heard about GM foods from friends. Respondents in the category research institutes have received information from all the sources but other three categories had received information only two or three information sources. The results clearly revealed that, the most effective way to increase awareness on GM food is TV & radio. In similar studies carried out by other authors [13,14], also have concluded TV and radio as the most effective information source. As such, results of this study are in agreement with the results of those studies. As an average, 67.5% of Sri Lankan population has received information on GM foods by TV and radio. Hence to further improve the awareness of Sri Lankan people on GM foods TV and radio programme would be most effective.

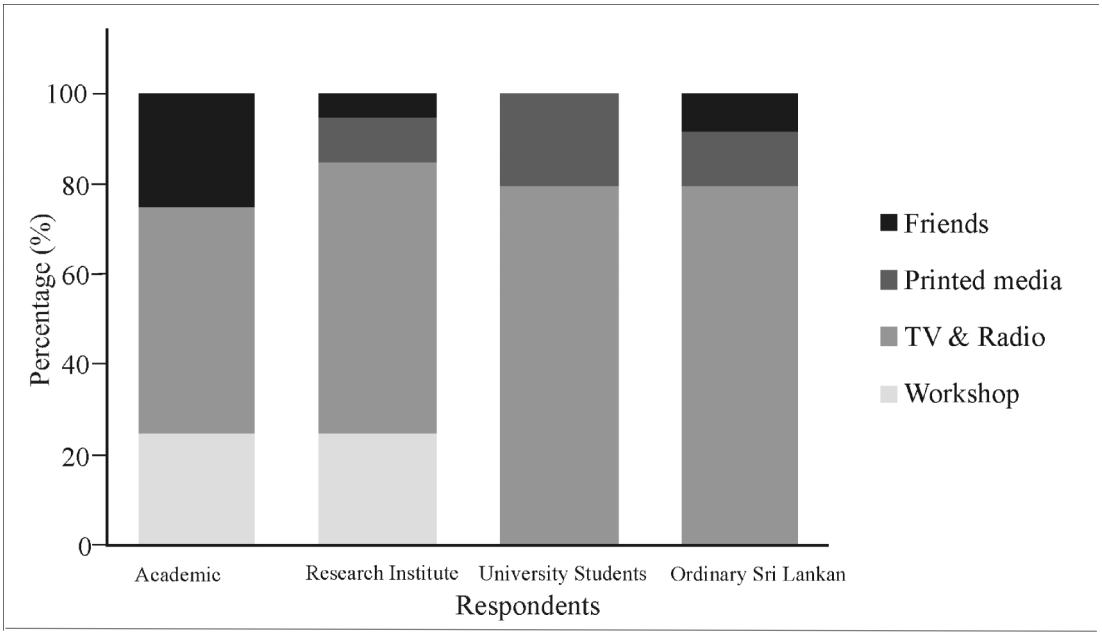

Fig. 2. Source of information

3.3 Level of Knowledge on Biotechnology and GM Foods

Relationship between educational level of the respondents and knowledge on GM foods was studied. There was a clear distinction between the respondents on the level of knowledge on GM foods. Respondents from the academic and research institutes showed significantly higher knowledge compared to others (Fig. 3). Fifty (50%) and Sixty-five (65%) percent of respondents from academic and research institutes respectively had excellent level of knowledge about the GM foods. Only twenty (20%) and five (5%) percent respondents from university students and ordinary Sri Lankan respectively had excellent level of knowledge. Sixty (60%) and sixty-five (65%) percent respondents from university students and ordinary Sri Lankan respectively had average knowledge level. Forty-six (46%) and thirty-three (33%) percent respondents from academic and research institutes respectively had average knowledge level. The very few respondents from all categories had low knowledge level as four (4%), two (2%), twenty (20%) and thirty (30%) percent from the academic, research institute, university students and ordinary Sri Lankan respectively. These results clearly shows that, academic and research institute have more than 50% of excellent knowledge on GM foods while other two groups i.e. university students and ordinary Sri Lankan have average knowledge on GM foods. University students who showed excellent knowledge on GM food were very low and it is an unusual behavior. Possible reason for this may be that, biotechnology study as a subject only by biology stream students [4] but in this study we selected randomly all stream students. Other reason is that, more than 50% of total university students of Sri Lankan Universities are from non science streams. Therefore, in a random sample those may represent a higher portion of the sample.

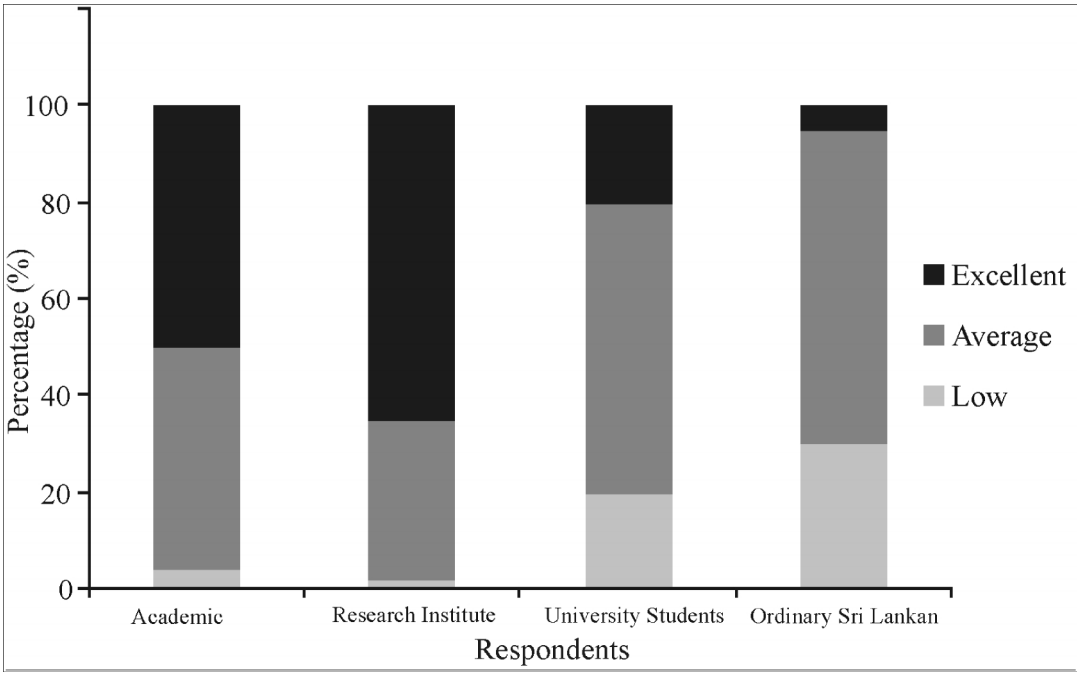

Fig. 3. Level of knowledge on biotechnology in Sri Lankan

However, as per the results of this study, most of the respondents from all categories are having average or excellent knowledge. Possible reason for this may be the source of information. Most of them had heard about GM foods via the TV & radio which is one of the effective media to correct information & technology transfer. Very few respondents had heard about GM foods from their friends. Therefore the problem of misunderstanding and transfer of partial information has been avoided. Whilst looking the study of Ghana [5], the knowledge of Ghananian people on GM foods was between average and low. Possible reason for this can be their major source of information which was from their friends.

3.4 Level of Interest on GM Foods

Level of interest of respondents on GM foods was studied and the results of the study are illustrated in Fig. 4. There was a clear distinction in the level of interest on issues of Biotechnology and GM foods among respondents from ordinary Sri Lankan on one side and other three on other side. Seventy-five (75%) percent respondents from academic and sixty-five (65%) percent respondents from each research institute and university students interested on those issues. But ordinary Sri Lankan showed significantly low interest compared to others. Only thirty-five (35%) percent of ordinary Sri Lankan said that they are interested. Forty (40%) percent respondents from ordinary Sri Lankan were not interested, but only five (5%) and ten (10%) percent respondents from research institutes and university students respectively were not interested. Same percentage (25%) of respondents from academics, university students and ordinary Sri Lankan said that they are very interested on those issues. Thirty (30%) percent of respondents from research institutes were very interested on those issues. These results clearly shows that, all academic in the country are interested on the GM foods related issues while 40% of ordinary Sri Lankan are not interest.

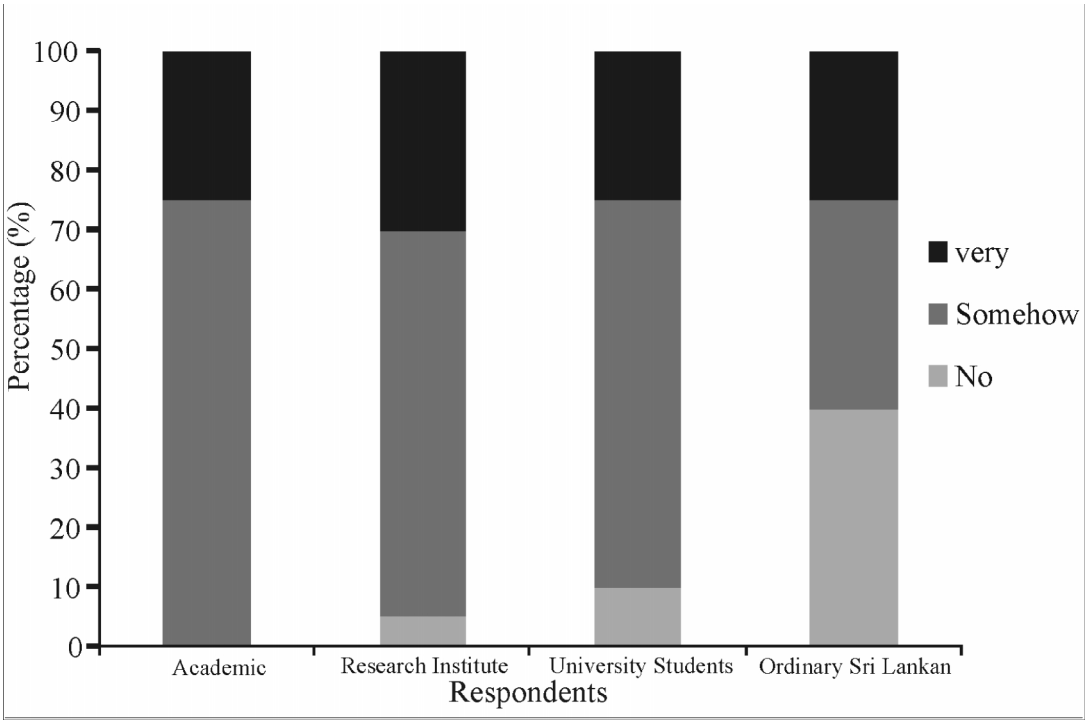

Fig. 4. Level of interest on GM foods

3.5 Willingness to Accept GM Foods

The willingness to accept GM foods was also investigated and those data are illustrated in Fig. 5. There was a significant separation among four categories according to their willingness to accept GM foods. According to their willingness to accept GM foods, two categories academic and research institutes were on one side and the other side represent by university students and ordinary Sri Lankan. Seventy (70%) and sixty-three (63%) percent respondents from academic and research institutes respectively are willing to accept the GM foods while twenty-one (21%) and twenty-five (25%) percent of university students and ordinary Sri Lankan respectively are willing to accept. Seventy-nine (79%) and sixty-eight (68%) percent respondents from university students and ordinary Sri Lankan are not willing accept GM foods, but only twenty-four (24%) and twenty-nine (29%) percent respondents from academic and research institutes respectively not willing to accept. Very few respondents from all categories which is six (6%), eight (8%), zero (0%) and seven (7%) percent of academics, research institute, university students and ordinary Sri Lanka respectively were not sure about whether accept GM foods or not. Consequently, the results clearly revealed that, most of educated peoples have accepted GM foods. But in here most of the University students also were not willing to accept GM foods. The reason for this unusual behavior most probably is their level of knowledge which was recorded as average.

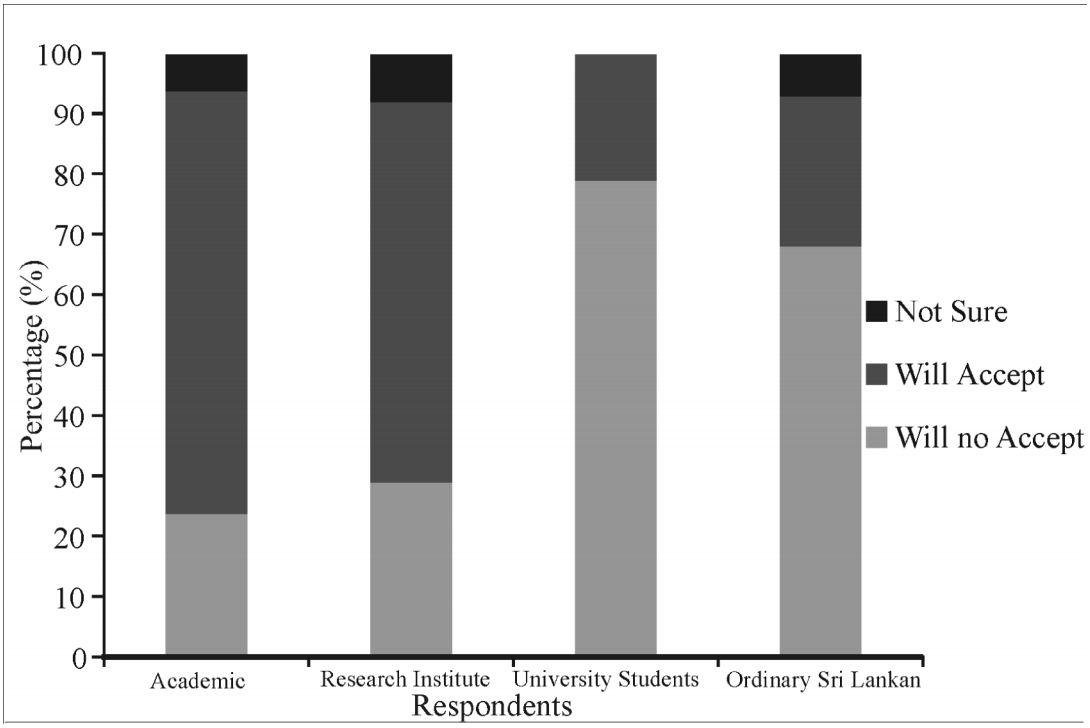

Fig. 5. Willingness to accept GM foods

3.6 Reasons for Rejecting GM Foods

The reason for rejecting of GM food of the majority of respondents was fear of side effects (Fig. 6). Ninety-five (95%), ninety (90%), eighty-eight (88%) and eighty-one (81%) percent of respondents from academics, research institutes, university students and ordinary Sri Lankan mentioned that fear of side effects as their reason for not accepting GM foods. Religious considerations were very minimal among the four categories as five (5%) percent from academics, ten (10%) percent from research institutes, twelve (12%) percent from university students and eight (8%) percent from ordinary Sri Lankan. Only eleven (11%) percent of ordinary Sri Lankan could not assign any reason for their rejection of GM foods. Finely, this result unveiled that, major reason for reject GM foods is fear of side effects. Similar results have been obtained in number of other studies [5,6,8,9,10,12].

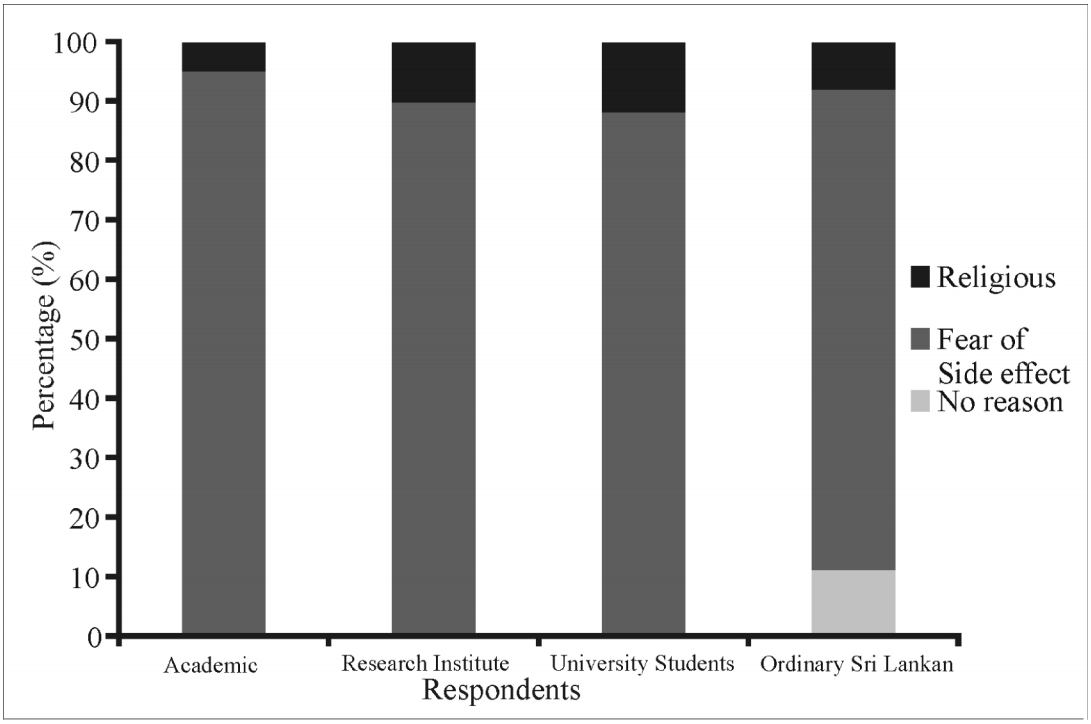

Fig. 6. Reasons for reject GM foods

4. CONCLUSION

According to the results of the study, awareness of Sri Lankan public on GM food was found to be higher than that of most of the reported results from other countries. However, more than 50% of Sri Lankan public have average or low knowledge on GM food. As such, there is a need of public education on GM foods in Sri Lanka. TV and radio was found as the most effective method which can be used to conduct educational programmes on GM foods. These education programmes, should mainly focused on health risks/side effects of GM food as that was found as the main reason for the rejection of GM foods by Sri Lankan public.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. FAO. The State of Food Insecurity in the World 2012. Available: http://www.fao.org/docrep/016/i3027e/i3027e00.htm.
2. WFP. Hunger; 2014. Available: http://www.wfp.org/hunger/causes.
3. WHO. 20 questions on genetically modified foods; 2014. Available:http://www.who.int/foodsafety/publications/biotech/20questions/en/index.html
4. Senarath SN, Karunagoda RP. Consumer attitudes towards labeling of genetically modified foods in Sri Lanka. Tropical Agricultural Research. 2012;23(3):283-288.

5. Buah JN. Public perception of genetically Modified Food in Ghana.American Journal of Food Technology. 2011;6(7):541-554.
6. Chern WS, Rickertsen K, Tsuboi N, Fu T. Consumer acceptance and willingness to pay for genetically modified vegetable oil and salmon: A multiple-country assessment. Ag. Bio. Forum. 2002;5(3):105-112.
7. Banati D, Szabo JA. Knowledge and acceptance of genetically modified food stuffs in Hungary. Acta Biologica Szegediensis. 2006;50(3-4):115-119.
8. Burton M, Rigby D, Young T, James S. Consumer attitudes to genetically modified organisms in food in the UK. European Review of Agricultural Economics. 2001;28:479-498.
9. Kimenju SC, De Groote H, Karugia J, Mbogoh S, Poland D. Consumer awareness and attitudes toward GM foods in Kenya. African Journal of Biotechnology. 2005;4(10):1066-1075.
10. Zhang C, Bai J, Huang J, Hallman WK, Pray C, Aquino HL. Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Denver, Colorado. 2004;1-4.
11. Spetsidis NM, Schamel G. A survey over consumer cognitions with regard to product scenarios of GM foods in Germany. Paper presented at the 71st EAAE Seminar on the Food Consumer in the Early 21st Century, Zaragoza, Spain; 2001.
12. McCluskey JJ, Grimsrud KM, Ouchi H, Wahl TI. Consumer response to genetically modified food products in Japan. Agricultural and Resource Economics Review. 2003;32(2):222-231.
13. Frewer LJ, Miles S, Marsh. The media and genetically modified food; Evidence in support of social amplification of risks. Risk Anal. 2002;22:701-711.
14. McCluskey J, Swinnen J. Political Economy of the Media and Consumer Perceptions of Biotechnology. American Journal of Agricultural Economics. 2004;86(5):1230-1237.

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