

The Need to Label Genetically Modified Products from the Perspective of Community Health and Consumer Rights: A Review

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Abstract

Introduction: The production and supply of genetically modified organisms is one of the issues that have led to many legal, health and environmental issues. This research attempts to study the requirement for labeling of genetically modified products in terms of consumer rights and community health.

Methods: This Review Article survey results researches from 2002 to 2016 with key word society health, genetic modified products, consumer rights, labeling at databases of Google scholar, SID, Iranmedex, Medline, PubMed, Springer, Science Direct, ProQuest, Magiran, MSRT journals system, Iran medical journals information system and ISC.

Results: According to reported studies, genetically modified products may affect human health, environment and society. Labeling of genetically modified products elevates awareness of consumers and provides informed choice of them. The responsibility of genetically modified products in non-harmfulness is duty of producers and suppliers of genetically modified products.

Conclusion: In line with protecting human and society's health, to meet consumer rights and environmental law and especially the precautionary principle, the labeling of genetically modified products is necessary.

Keywords: Community Health, Genetic Modified Products, Consumer Rights, Labeling

Introduction

Food quality, and its processing are important and vital issues in the health of the community and have been considered since the past and are now also of great importance in both domestic and foreign communities. The emergence of optimal patterns of resource use in producing and raising the harvest level and keeping it safe from pests, with changes in the genetic make-up of food products, increased productivity, as well as maximum product yields as well as speed doubled growth. By 2015, genetically modified plants have been planted in 28 countries (8 industrialized countries and 20 developing countries) with a total of 179.7 million hectares of land, covering more than 10% of the world's agricultural land (1) In recent years cultivation of genetically modified products increased in

industrial and developing countries (2) this increase is shown in Figure 1. The technology of genetic modified food products and the rising volume of these products in many countries have increased the volume of international exchanges. In addition to the benefits of developing new technology and the production of genetically modified organisms, bioremediation implies the prevention of the potentially harmful effects of the use of this new technology on the environment, human health, livestock and plants and countries are seeking to formulate policies, laws, regulations, and adopting methods to ensure the safe use of the benefits of modern biotechnology.(3) Biosafety through activating national and international preventive measures tries to reduce the adverse effects of genetically modified products (4). In some

cases, however, the nutritional value of products can be reduced to a less optimistic state or losses may still not be proven (5). Over the past few decades, the entry of genetically modified products (products whose genetic structure has been changed) into food, pharmaceutical, and livestock markets has been very controversial (6). On the one hand these products have been welcome due to the good performance and production resulting from the genetic changes applied to them, causing increased production and reduction of hunger in the world and the production of new medicines and saving the lives of sick people or increasing the production of livestock products. On the other hand, there are concerns about the exploitation of these products, which are mainly related to human health and the environment (7, 8). Of course ethical considerations is another main concern related to production and supply of genetically modified products (9, 10, 11, 6). Even production, supply and consumption of genetically modified products raise cultural and religious problems (12) What is under discussion in the article is that consumer rights require that, in any case, even if there is no difference in terms of food properties or its harmfulness between organic and genetically modified products, The right to safety and health, choice and awareness of the risk in the commodity, which is one of the most fundamental consumer rights, is labeled so that consumers can make informed choices according to their health and the community(13– 20) In this research, it is tried to discuss legal and ethical issues related to the production and supply of genetically modified products and their impact on the health of the society and to examine whether the labeling of genetically modified products is required in terms of consumer rights and community health guarantees. Therefore, it is necessary to consider the obligation to label products by suppliers of genetically modified organisms in their supply and the sale and purchase of these

products and the basis for their responsibility towards the consumers of the products. To the extent and limits of the rights and obligations of the providers of production, suppliers and users should be better informed about the health of the society.

Methods

For collecting this review article, all articles search by key words such as community health, genetic modified products, consumer rights, labeling in databases such as google scholar, SID, Iranmedex, medline, PubMed, Springer, Science Direct, ProQuest, Magiran, MSRT journals system, iran medical journals information system and ISC. At the end authors surveyed released results during years from 2002- 2016.

Results

In recent years cultivation of genetically modified products has increased in industrial and developing countries. As indicated in Figure 1. Cultivation of genetically modified products in industrial countries has been more than developing countries. Meanwhile through time rate of cultivation of genetically modified products in developing countries supersedes industrial countries from 2009 to 2016 (Figure 1). According to reported studies, genetically modified products have different effect on society and different articles have been published concerning awareness of persons from product (organic or genetically modified). In this regard Hashemi and Shojae Sadat (2012) reported that assurance of genetically modified products' non-harmfulness for human and environment is necessary (5). Tohidfar and Azadi (2013) concluded use of genetically modified products has not harmful effect on environment and human health (21); Askari (2013) concluded for assurance of health genetically modified products should be under national and international surveillance (22);

Mohammadi and YazdanPanah (2013) concluded that the use of genetically modified products created questions and concerns from point of health and environment (23); Bigdeli and Badiesanaye Esfahani (2014) concluded genetically modified products potentially have an abundant capacity for creating and body loss that can have effect on environment and persons (24); Khosravi and Tohidfar (2015) concluded cultivation of genetically modified crops cause reduction of applied pesticides and cancer (25); Kazemi and Abbasi (2007 & 2008) concluded mandatory labeling of GM and GMO enables consumers make informed choices and protect their right to health. so labeling enable them for realize potential problems for health of consumers even environment (17, 26) (Table 1). In some countries labelling genetically modified products is mandatory and in some countries there is no obligation for labeling (3) in this regard Mehdizadeh *et al.* (2011) concluded that genetically modified products labeling is a method for awareness and information of food consumers (19); Vidar (2010) concluded genetically modified products labeling from point of view of public participation and information is mandatory (15); Albert (2010) concluded genetically modified products labeling policies is weaker in comparison with organic products(27); Compagnoni (2010) concluded genetically modified products labeling must be different from organic and non-organic food(14) Liu (2010) concluded that giving information on genetically modified products and organic product causes better decision making (13) (Table 1). Genetically modified products labeling results in assurance of consumer rights; in this regard Hossini (2009) concluded Consumer rights should be protected in pharmaceutical and cosmetics advertising and marketing (16); Salehimazandarani and Rezae (2016) concluded obligatory labeling system is familiar with consumer rights (20); also according to Religious law, use of genetically

modified products is not forbidden but some grand jurisprudent stipulated that this use does not entail losses in the present and future (12) (Table 1). The domestic legislator has not neglected this technology in recent years and in the most important steps has approved the National Biosafety Act of the Islamic Republic of Iran (2009) in accordance with the 1992 international biodiversity convention and the 2000 convention on biological diversity, Cartagena protocol, on biodiversity (28). According to National Biosafety Act: All of the real and legal entities who are intended to import, export, transport or transboundary movement of LMOs pursuant to this act are obliged to: ... II) Consider required conditions for packaging, transport and labeling. Conditions of packaging and labeling, transport and transboundary movement will be compiled by the NBC within 6 months and will be informed after confirmation by the president (29) according to executive by law of Art.7 National Biosafety Act (2015), label means : every document or informative letter that indicated Product content of engaged living modified organisms payload that installed on board (30). Food and drug administration of the Islamic Republic of Iran enacted executive instruction least condition of labeling food and drinking products (2014), stipulated condition of labeling genetically modified food and products that can see in Table 2. Since internationally, in the 1960s, the first laws aimed at consumer protection have been adopted in various European countries, and the European economic commission and later the European Union, the main developer of consumer protection rules at the European level (18). Also, the European Union in the field of regulation of genetically modified products, has been able to formulate a coherent legal system for these products through regulation. In this regard, the lawmaker of Iran in 2009 also approved the Consumer Rights Protection Act. Obviously,

Table 1. brief studied related needs to labeling genetically modified products from point of view health and environment

Category	Researcher	Year	Subject	Outcomes
Health, Environment	Hashemi and Shojae Sadat	2012	opportunities & challenges use of Genetically- modified food	assurance from genetically modified products are non-harmfulness for human and environment
	Tohidfar and Azadi	2013	Ecological Risk Assessment of Genetically-Modified Ornamental Plants	use of genetically modified products has not harmful effect on environment and human health
	Mohammadi and YazdanPanah	2013	benefits and considerations of use of Genetically modified crops	use of genetically modified products created questions and concerns from point of health and environment
	Khosravi and Tohidfar	2015	Reduction of applied pesticides and cancer with the cultivation of transgenic crops	cultivation of genetically modified crops cause to Reduction of applied pesticides and cancer
Consumer Right	Kazemi and Abbasi	2007	Genetically Modified (GM) and Consumer Rights	Mandatory labeling GM and GMO enable consumers make informed choices and protect their right to health
		2008	Genetically Modified (GM) and Consumer Rights	
	Mehdizadeh et al	2011	Labeling of genetically modified foods and Consumers' rights	genetically modified products labeling is method for awareness and information of food consumers
Environment	Liu	2010	Voluntary environmental and social labels in the food	give information on genetically modified products and organic product cause to better Decision Making
Consumer Right, Labling	Salehimazandarani and Rezae	2016	Labelling GM products	obligatory labeling system is familiar with Consumer rights
Health	Askari	2013	impact of Agri-biotech on human health from Biological drugs and food	for assurance of health of genetically modified products should be under national and international surveillance
Responsibility, Environment	Bigdeli and Badiesanaye Esfahani	2014	The Civil Liability's Basis of Genetically Modified Foods	genetically modified products potentially has an abundant capacity for creating property and body loss that can have effect on environment and persons
Food, Consumer Right	Vidar	2010	International legal frameworks for food labelling and consumer rights	genetically modified products labeling from point of view of public participation and information is mandatory
Food Labelling	Albert	2010	Introduction to innovations in food labelling	genetically modified products labeling policies is weaker in comparison with organic products
	Compagnoni	2010	history and latest trends of Organic food labels	genetically modified products labeling must be different between organic and non-organic food
Drug, Health, Consumer Right	Hosseini	2009	Observing consumers' rights in pharmaceutical and cosmetics advertising and marketing	Consumer rights should be protected in pharmaceutical and cosmetics advertising and marketing
Islamic issue	AllahyariFrad	2013	A study of Islamic (Shia) views about consumption of genetically modified organisms products	according to Religious law, use of genetically modified products is not forbidden but some grand jurisprudent stipulated that this use do not entail losses in the present and future

Table 2. condition of labeling genetically modified Raw material and food products

Genetically modified food products	Example	Label
Seeds of genetic change found	Corn, Soya, Cotton	Yes
Genetically modified foods	Tomato Paste, Potato, Corn Snack	Yes
Foods derived from genetically modified materials	Wheat Flour, Corn, Soya Oil, Nectar glucose from corn starch, canola oil	Yes
Foods from animals fed with animal feed have been genetically altered	Meat, Milk, Egg	No
Foods produced with the help of genetically modified enzymes (Processing aid)	Flour products that have been genetically modified using amylase	No
Additives prepared from genetically modified material	Lecithin taken from the soybean for genetically modified chocolate	Yes
Genetically modified microorganisms used as food components	Yeast extract, yogurt produced by genetically modified lactobacilli	Yes
Products that contain genetically modified enzymes (In cases where these enzymes are used as additive or for technical purposes)	Improvers (industrial and semi-industrial breads, fantasy and bulk breads(Yes

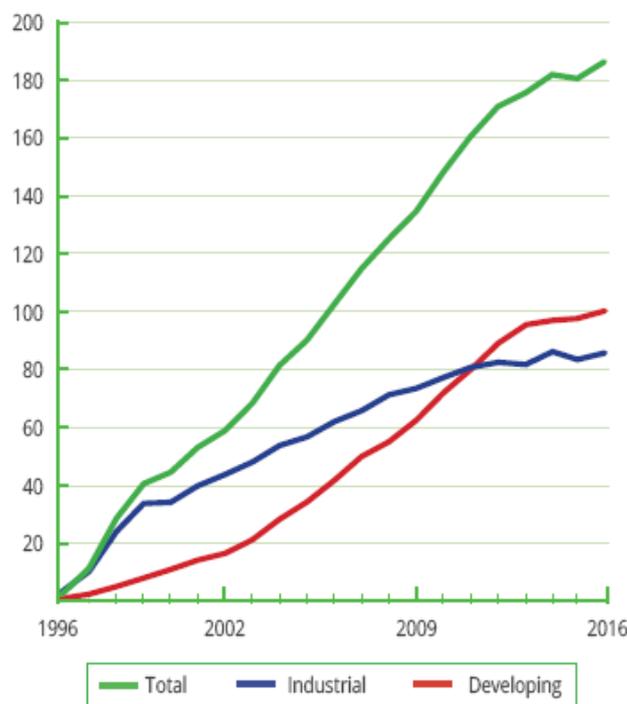


Figure 1. Global Area of Biotech Crops, 1996- 2016: Industrial and Developing Countries (Million Hectares)

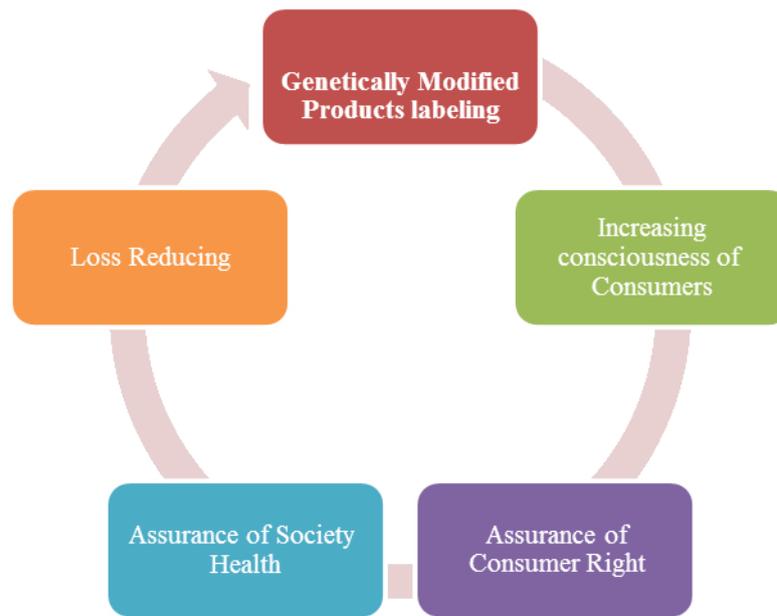


Figure 2. Effect of labeling on health of society

the right to safety and health, the right to choose and the awareness of the risks in the goods are one of the most important fundamental consumer rights. Therefore, according to the Consumer Rights Protection Act, "all suppliers of goods and services are solely or jointly responsible for the health and well-being of the goods and services supplied in accordance with the terms and conditions set forth in the laws or the contents of the relevant contract or custom in transactions" (31). As genetically modified products may affect health of society, genetically modified products must due to consumer right and respect to right of choice be labeled until consumers have an informed choice. As show in figure 2, genetically modified products labeling cause to more information and awareness of consumers that this issue assurance health of society and reducing loss.

Discussion

For the correct definition, it is necessary to note that consumer rights in the "general sense" are not limited solely to the rights of final consumers of goods and services, but

companies against all people in society, even next generations are responsible. For example, harming the environment or contaminating water, even with the production of quality goods for the final use of a small group of people, is unjustifiable and incomprehensible (18). Since the supply of genetically modified products can be accompanied by risks to the health of the community, labeling should be made in accordance with environmental and consumer rights. Risk assessment may be considered as part of the precautionary principle since it tries to evaluate the probability of various injuries caused by a proposed activity based on a decision that can be made. The principle of precaution is one of the most important legal principles. Therefore, the inclusion of this principle in the Declaration of Principles (Principle 15), the precautionary principle, also quickly became applicable to other areas of international environmental law. In the event of severe or irreparable damage, the absence of definite scientific reasons should not be used as an excuse to delay the adoption of effective measures to prevent the introduction of

environmental damage (32). Precautionary measures to avoid potential harmful effects that are uncertain as to the consequences and consequences of scientific research, such as the effects and consequences of the use of insecticides, as well as the use of recombinant or manipulated genetic products (32). Scientific uncertainty is considered as a major obstacle to the effective implementation of environmental regulations in implementing the precautionary principle (33). In practice, scientific uncertainty is becoming increasingly important in all environmental decision-making. If the principle of good faith is applied absolutely, the inevitable scientific uncertainty makes it impossible to determine the implementation and timing of those activities, which implies the probability of entry of environmental damage - no matter how much it costs. In order to avoid this, at least, completely hypothetical risks should be ignored, and should not be taken into account for minor losses with very low probability (34). It is also difficult to determine whether the burden of proof should be borne by the beneficiary or protector. It is not surprising that countries cite the definite scientific uncertainty associated with global environmental processes as a pretext for failing to act in such cases. But one of the obvious features of the precautionary principle is to shift and transfer the burden of proof of the claim to prove the harmfulness of the activity or project for the environment. According to the precautionary principle, it is the responsibility of someone who is eager to perform an activity to prove that the activity is not harmful. Such a person must demonstrate that doing the intended activities does not cause damage to the environment (35). In other words, "those who engage in potentially hazardous activity should take the burden of proving the absence of environmental damage" (36). Therefore, with the exception of some exceptions, the principle of good faith can change the burden of proof in such a way that

a country (or person) does not allow unacceptable environmental damage until it proves cannot do such an activity. Examples of such a change in the burden of proof are, to a large extent, linked to the use of global commonality. This change in the burden of proof implies the most powerful command of the principle of prudence. In this way, this burden change proves the most important effect on environmental protection and, as one of the authors has stated, it should be said: "Until now, the infectant uses scientific uncertainty, and hence, definition serves the interests of the environment" (37). Environmental potential impact assessment for legal conforming transgenic animal in countries accepted Cartagena Protocol on Biosafety is mandatory (38) the duty of producers for labeling genetically modified products raised according to precautionary principle and consumer rights. Therefore supply genetically modified products in market must be conditioned on assurance of non-harmfulness for health of consumers (39, 40) even this responsibility will not release with proving take precautionary measures (24).

Conclusion

Genetically modified products affect human health and environment. Precautionary principle stipulated in production and supply genetically modified products, and environmental impact assessment has to be performed. Genetically modified products labeling cause more awareness of consumers. The need to labeling genetically modified products for manufacturers and suppliers of this type of products is essential. So labeling supply genetically modified products help informed choice and health of society.

Ethical issues

Not applicable.

Authors' contributions

All authors equally contributed to the writing and revision of this paper.

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