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Assessment of the Effects of Genetically Modified (GM) Foods: A Brief Study on Health and Environmental Concerns

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Abstract

The genetic modification of an organism involves transferring DNA, the genetic component from a plant or bacterium, or even an animal, into a different organism. The aim of the review study to find out the positive and negative effect of GM crops on human health and environment finally awareness to the people to acceptance the GM crops it beneficial effect from lowest hazard. Opportunity presented by proponents of GM technology include development in fruit and vegetable shelf- life and organoleptic quality, prosperous nutritional quality and health benefits in foods, elevated protein and carbohydrate content of foods, exalted fat quality, high quality and quantity of meat, milk and livestock. We study various type of review article on GM foods and findings the positive effect it's the methodology of this paper. In addition, some more common concerns include environmental pollution, unintentional gene alteration to wild plants, probable creation of new viruses and toxins, restricted access to seeds due to patenting of GM food plants, impedance to crop genetic diversity, religious, cultural and ethical concerns, as well as fear of the unknown. Boosters of GM technology include private industries, research scientists, some consumers, U.S. farmers and regulatory agencies. The result of the study minimizing potential risks and maximizing the profits of GM foods finally it should be approval for us. Because the advantages of GM foods ostensibly far out weight the risks, regulatory agencies and industries engaged in GM food business. Finally increment public awareness in this technology to prolong worldwide acceptability of GM foods will be reducing in future of food crisis in the world.

1. Introduction

Genetic modification is a biological technique that effects alterations in the genetic machinery of all kinds of living organisms. GMO is defined as follows by WHO (World Health Organization): "Organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that

does not occur naturally by mating and/or natural recombination" [1]. Genetic engineering is desired at benefiting mankind. Therefore food manufacturers would never purposely use a conversant toxin or allergen because it is not in manufacturer's usury to market foods that would hurt their customers, consumers, or anyone. Moreover, GM food manufacturers subject such foods to more severe testing than is required of traditionally bred fruits and vegetables or animals. Despite this well-intentioned dimension, genetic modification of foods has been encompassed by controversy since the early I990s. The cloning of Dolly the sheep in Scotland sparked several controversial debates, skepticism and speculations, not only about cloning but also other aspects of genetic engineering [2]. Genetically modified organisms (GMOs), also known as genetically engineered or transgenic organisms, for use as human foods or animal feeds are common place now a days. On November 19, 2015, the Food and Drug Administration (FDA) of the United States approved the first-ever genetically modified animal for human consumption [3].

The term "genetically modified food" or GM food refers to products promoted through biotechnology. Since "biotechnology" can include many processes and applications, the term "genetically modified" is practical only to products that have been genetically engineered, that is, where genetic material (deoxyribonucleic acid or DNA) has been manipulated or where genes from one organism (animal, plant species or microorganism) have been shifted to the genetic material of another. Different terms are used in the scientific literature to detail the products that result from the use of these techniques: for example. "Transgenic organism", "genetically modified organism (GMO), "genetically enhanced organism," or living modified organism (LMO). These plants are used in a limit of food products; for instance, soya is usual in processed products such as chocolate, baby food and cake mixes. Transgenic animals have been produced for research intention or for manufacturing pharmaceutical products but, for the flash, these have not entered the food chain [4].

Genetic engineering of food has been with man since time forgotten. Forms of genetic engineering have been studied by resourceful farmers by breeding plan. and animals to punctuate certain quality, by gathering and planting the seeds of fatter corn, by selecting meatier and hardier animals for breeding, and by cross-fertilizing different species of plants to create new varieties that display the most desirable property of the parent plants [5]. Traditional plant breeding is, however, random and imprecise, and it can take up to 20 years to produce a commercially expensive new variety. This approach is limited by the fact that breeders can only cross a plant with its close comparative. Direct application of genetic engineering techniques along traditional breeding started in the 1960s, has expansive in the 1990s, and will perhaps proceed into the 21st century [6]. Scientists in China first commercialized genetically modified tobacco in early 1990s. In 1994 the US market saw the first genetically modified species of tomato with the property of delayed ripening approved by the Food and Drug Administration (FDA) [7].

Genetic modification service recombinant deoxyribonucleic acid (rDNA) technology to change the genes of microorganisms, plants, and animals. Genetic exchange is also called biotechnology, gene splicing, recombinant DNA technology, or genetic engineering. Contemporary genetic alternation was developed in the 1970s and basically transfers genetic element from one creature to other. The modification of organisms has existed for centuries in the form of plant-breeding techniques (such as cross-fertilization) used to produce desired units. The isolated genes do not have to come from similar species in order to be functional; theoretically, genes can be transferred among all microorganisms, plants, and animals [8].

2. Positive effect of GM foods

2.1. Development in fruit and vegetable shelf-life and organoleptie quality

Bio preservation systems in foods are of increasing interest for industry and consumers [9]. GM has led to high shelf-life and organoleptic quality in certain crops. The Flavr Savr tomato is the first genetically engineered crop and whole food approved by the FDA. Flavr Savr tomato was produced by Calgene Corporation. It was bio-engineered to ripen on the vine, and have a longest shelf-life by having delayed ripening, softening and rotting processes. Delayed mature of fruits and vegetables (via ethylene control technology and suppression of cell Wall destructive enzyme, polygalacturonase) leads to excellent flavor, color, texture, longer shelf-life and better shipping and handling feature [10]. At present, sweet-tasting, firmer, seedless peppers and tomatoes have been grown.

2.2. Improved nutritional quality and health benefits

Genetically modified crops have tailored and added value characteristics such as nutrients and health opportunity. Bovine growth hormones accelerate milk production in cows. Pigs can also be treated with a hormone called recombinant porcine somatotropin (rPST), a growth hormone that augment meat production in pigs, and less the amount of fat thereby producing low-fat pork. Soya bean could also be bio-engineered to form a enormous nutritious and flavorful crop. Genetic engineering can be used to enhance levels in food of minerals and ordinary occurring anti-oxidant vitamins (carotenoids, flavonoids, vitamins A, C, and E), compounds that can slow or close biological oxidation, a damaging chemicals reaction, that exhibits to promote the promotion of some cancers, heart disease, and blindness [11].

2.3. Improved protein quality through GM foods

Protein quality of foods and feeds have been elevated by genetic engineering, and there is less risk of allergies from GM foods than in common foods (such as Brazil nut and peanut) already in the market or in plants produced by classical breeding methods which introduce dynamic allergens into the product. Prosperous protein quality may involve an increase in the necessary amino acid content of the crop, for example, a raise in the methionine and lysine content of the protein [12]. It may also involve development in the functional properties including organoleptic qualities thereby expanding the use of plant protein in different food systems. For example, efforts are under way to withdraw the beany flavor in soybeans through withdrawal of lipoxygenases. Fish, which is a good source of dietary protein, could be grown cheaply through genetic engineering, and these could be conditioned to grow richer in a short period, thus becoming a viable option for aquaculture.

2.4. Increase in carbohydrate content through GM foods

The generation, a modified potato variety, is a good example for the latter scenario. Enhanced nutritional value in transgenic products has been obtained by manipulating their composition of carbohydrates [13]. The carbohydrate content of some food crops has been aggravated by genetic engineering. Tomatoes with exalted solids content have been grown and this is useful to food processors for making tomato paste and sauce. Potato has been genetically modified to have a lofty solids content, which makes it useful for making French fries Starke. The high solids potatoes that have been raised by Monsanto Corporation (through placing of a starch producing gene from bacteria into the potato plant), absorbs without oil during processing into French fries [14]. The modification of the potato results in reducing in cooking

time, costs and fuel use. This leads to better tasting French fries that take measure economic benefit to the food processor [15].

Table 1: Scientific evidence for observed health benefits of antioxidant vitamins in chronic disease.

Disease	Vitamin C	Vitamin E	B- Carotene
Cardiovascular disease	+	+ + +	+
Cancer	+ +	+ +	+
Cataracts	+ +	+ +	+ +
Immune function	+ +	+ + +	+ +
Arthritis	+	+	+
Alzheimer's disease	-	+ +	-

- Little or no testimony of relationship; +few testimony of relationship; + +Good evidence of relevance; + + + Excellent proof of relationship.

2.5. Improvement in quantity and quality of meat, milk, and livestock production

Genetic engineering, particularly animal cloning, could lead to large-scale production of livestock to meet the high need for meat and protein foods [16]. Countries with the technology for cloning will be capable to produce excess livestock which can be consigned cheaply to countries with scarce meat and milk supply. Dairy cows can be act with BST, approved by the FDA since 1993, to extend milk production in cows. BST is not a human health problem, and moreover it is a protein which is digested in the gastrointestinal tract, so it is think as safe. If excess milk is produced by the use of BST, the milk can be exported to earn alien exchange. Transgenic animals will be tailored to produce excess milk or meat with special qualities, for example, lactose-free milk, less fat milk, low cholesterol meats, low fat meats or meats with especial protein and nutrient composition in a cost-effective procedure [17]. Transgenic livestock can also be used to clear large quantities of recombinant proteins such as fibrinogen in milk of mammary glands [18]. Transgenic proteins become necessary alternatives to blood proteins attained from donated human blood which is feared as a strong source of Human Immunodeficiency Virus (HIV) and Bovine Spongiform Encephalopathy (BSE).

2.6. Increased crop yield

Genetic engineering can be used to aggravated crop yield and reduce crop loss by making plants lasting to pests, weeds, herbicides, viruses, worm, insect, salinity, pH, temperature, frost, drought, and weather [19]. Insect preventive fruits such as apples, virus resistant cantaloupes, and cucumbers, and herbicide tolerant corn, tomatoes, potatoes, and soybeans have all been grown. Major cereal crops which arc annuals may be converted by GM to perennials. This would reduce tillage and erosion, and lead to protection of water and nutrients [20]. It would also augment crop yield during the year. Such perennial crops would reduce labor costs, improve labor allocation, and generally improve the sustainability of agriculture; Drought resistance in GM crops will abate water use in agriculture. This will be very useful in few tropical or and regions where water is scarce [21].

2.7. Manufacture of edible vaccines and drugs

Several tropical crops such as banana, which arc consumed raw when ripe, have been bioengineered to produce proteins that may be used us vaccines versus hepatitis, rabies, dysentery, cholera, diarrhea, or

other gut infections extensive in developing countries [22]. These vaccines in eatable foods will be helpful to children in developing countries where such foods are grown and distributed at less cost, and where resources and medical infrastructure for vaccine production arc lacking. The nutritionally increase crops will help to alleviate malnutrition and will enable developing countries to meet their basic dietary requirements, while disseminate disease-fighting and health-promoting foods.

The FDA has already permitted 'Benecol' and 'Take Control', two margarines that are guessed to lower cholesterol levels. Some biotech companies have also been capable to modify some plants like tobacco to synthesize drugs. Tobacco has also been engineered to consequence antibodies useful in man and livestock. Plants bearing human antibodies would also carry these materials is their seeds which would bargain a stable inexpensive source of genetic material for immunization against general disease. These plant vaccines would have a longest shelf-life and more stable storage capacity [23]. Several human genes have been inserted into plant chromosomes to yield large quantities of experimental biopharmaceuticals. Tobacco and potato have been engineered to outcome human serum albumin. Oilseed rape and Arabidopsis have been engineered to output the human neurotransmitter, Leu-enkephalin and monoclonal antibodies. Work is also going on to consequence insulin in plants. The insulin would be ingested by diabetics rather than accepted through shots. In addition, work is also underway to reveal canola oil that could replace whale oil in certain products.

2.8. Environmental advantage through GM roods

Environmental benefits include protection versus insect damage, herbicide tolerance for innovative farming, retrenchment in the amount of land needed for agriculture, protection of resources through use of low labor, fuel, fertilizer and water, water quality saving, and protection in opposition to plant disease [24].

2.9. Biological protection against diseases, weeds, pests, herbicides, viruses, and stresses

Numerous food plants, for example potato, soybean, and corn have been engineered with Bt gene which produces Bt protein (an insecticide). Although Bt is non-toxic to humans, and reduction in the stomach acid, it is poison to insects such as the European corn borer, cotton bollworms, and potato beetles. This toxic Bt protein extract the need for chemical pesticides against insects that transmit viruses and other bad microbes. Fewer pesticides use also minimizes strain on the environment. The snag with Bt insecticide is that it may command to insects developing resistance to toxins in the field or it may slaughter non-target insects such as the monarch butterfly [25]. In addition, few crop protection companies that produce pesticide chemicals might he financially browbeat.

2.10. Positive impact of GM on farming and food production

Genetic modification has positive influence on farming and food production. Through innovations in chemistry, biotechnology and crop science, agricultural productivity is grown. GM also increases fertilizer efficiency, promote crop production efficiency, and raise the world's food supply by creating environmentally friendlier crops. Biotech crops are now elevated to draw more nitrogen directly from the soil thereby decrement the need for chemical fertilizers and low damage from fertilizer run off. Waste fertilizer, which commonly evaporates or washes in to waterways, and estuaries, can imperil the

environment [26]. Through GM farmers have greater flexibility and like in pest management. Herbicide tolerant crops develop conservation tillage, conserve topsoil, and protect water quality.

2.11. GM plants can remove industrial waste and improve recycling of toxic chemicals

Genetic modification of plants has been necessary in bio-remediation. Some plants have been especially bio-engineered to enable them dispel toxic waste from the environment. Some researchers have reported incentive consequence using plants like mustard greens, alfalfa, river reeds, poplar trees, and special weeds to clean up the ravages of industries, agriculture, and petroleum occurrence [27]. In some cases, plants can digest the poisons, and alter them to inert compounds.

Table 2: Several herbicides and insecticides promoted through the GM technology.

Trade name	Common name	Function	Applicable crops	Company
Round Up	Glyphosate	Herbicide	Cotton, soybean, corn	Monsanto
Liberty	Glufosinate	Herbicide	Corn, canola	AgrEvo
Actigard (benzothi adiazole)	Acibenzolar-S-Methyl	Antifungal, Antibacterial	Several crops	Novartis
MAC(Molt Accelerating Compound)	(Diacyl hydrazine)	Insecticide	Several crops	Rohn and Haas
Touchdown of glyphosate	Trimethyl Sulfonium Salt	Herbicide	Several crops	Zenecca
Acuron Inhibitor	ProtoporphyrinOxidase	Insecticide	Several crops	Novartis
Bollgard	Protein	Insecticide	Corn	Monsanto
Bt toxin	*Bacillus thuringiensis* protein	Insecticide	Corn	Monsanto
Photorharbdus	Photoharbdus	Insecticide	Several crops	Dow
Bromoxynil	Bromoxynil	Herbicide	Cotton, canola	Rhone-Pulenc
Sulfonyl urea	Sulfonyl urea	Herbicide	Several crops	Dupont
DeKalb^{TM} Corp	Toxic plant protein	Insecticide	Corn	DeKalb Genetics
Star^{TM}	Imidazolinone	Herbicide	Corn, canola	American Cyanamid

2.12. GM products effective in organ transplants and in the treatment of human diseases

Because cloned animals model numerous human diseases, scientists can successfully study human diseases such as cystic fibrosis, for which there is recently no cure. Cloned animals may be used to produce pharmacologically helpful proteins such as clotting factor, used by hemophiliacs, or insulin used by diabetics. Several farm animals, for example goats, pigs and sheep, may be cloned, and used to grow organs such as hearts, livers, kidneys and fetal cells appropriate for transplant into humans. This could end the deep waiting period for organ transplants by seriously sick patients [28].

2.13. GM crops act as bio-factories and yield raw materials for industrial uses

By associate plant breeding and genetics with cell and molecular biology techniques, crop plants are now made to function as bio-factories [29]. Some GM crops are greatly designed to origin food enzymes, vitamins, monoclonal antibodies, vaccines, anticancer compounds, antioxidants, plastics, fibers, polyesters, opiates, interferon, human blood proteins, and carotenoids. GM can be aged to produce food

components like proteins, enzymes, stabilizers, thickeners, emulsifiers, sweeteners. Preservatives, colorants, and flavors used in the food industries [30]. Microorganisms used in food processing and pathogen discovery are being produced by GM. Food enzymes like chymosin used in cheese production can be inexpensively, produced through GM. Common crops as tobacco, corn, potato, and cotton can be genetically modified to manufacture various materials for example human proteins or enzymes as well as natural polymers (such as polyesters).

2.14. Future considerations

Although genetic modification of foods is significant and beneficial, it should be adopted under conditions that eliminate potential risks. Caution and suitable regulation are essential to avoid possible environmental and safety problems, which can jeopardize expected profit of this new science. The large agro biotech companies should establish measures to restrain movement of transgenes from pollen to relatives of GM crops or to weeds in nearby farms.

In this regards, field test facilities should be cordially designed and suitably located far away from nearby feral relatives or non- GM farms. Genes from few viral pathogens should be gingerly and closely monitored to eliminate the possibility of their combining with genes of other viral pathogens in the environment. This will detain creation of entirely new viral strains with dangerous consequences. They should also develop honest and open debate around the world to discuss the good and potential risks of GM foods, and possibly show efforts taken to circumvent those potent risks [31].

3. Negative effect of GM foods

The reviewer of genetic engineering of foods have concerns, not only for security, allergenicity, toxicity, carcinogenicity, and change nutritional quality of foods, but also for the environment. They fear that gene changing techniques can result in some error as these methods, like other human efforts, are far from foolproof. The new genetic material occasionally might not be successfully transferred to the destination cells, or might be transferred onto a false spot on the DNA chain of the target organism, or the new gene may inadvertently impel a nearby gene that is normally inactive, or it may change or inhibit the function of a different gene, causing unexpected mutations to occur, thereby making the resulting plant toxic, infertile, or improper. The following are some of the potential risks.

3.1. Alteration in nutritional quality of foods

Alien genes might alter nutritional value of foods in unpredictable ways by reduce levels of some nutrients while rising levels of others. This will cause a difference between the conventional strain and the GM-counterpart. In addition there is little information yet regarding the outcome of the changes in nutrient constitution of food plants and animals on: (1) nutrient interactions, (2) nutrient-gene interaction, (3) nutrient bioavailability, (4) nutrient strength, and (5) nutrient metabolism. There is also a paucity of information on condition in which these changed nutrients are involved in the complex regulation of gene expression [32].

Alter in food and diet through biotechnology occur at a pace far greater than the scientists' capability to predict the significance of alter on pediatric nutrition. Censor therefore advice that caution should be supervised regarding use of GM food products in infant roods.

3.2. Antibiotic resistance

In genetic engineering, marker genes enduring antibiotic resistance is often used in the target organism. There is a worry that deliberately breeding antibiotic resistance into broadly consumed crops may have unintended outcome for the environment as well as for humans and animals consuming crops. According to information from the British Medical Association, antibiotic resistant marker genes compacted into certain crops could be transferred to disease-causing microbes in the gut of humans or animals consuming GM foods. This could outcome in antibiotic resistant microbes in the population and profit to the growing public health puzzle of antibiotic resistance [33].

3.3. Potential toxicity

Genetic modification could inadvertently extend natural plant toxins by switching on a gene that has both the intended effect and capacity to pump out a poison. Genes for some ordinary toxins such as protease inhibitors in legumes, cyanogen in cassava and lima beans, goitrogens in canola species, and press or amines in bananas and plantains, may be turned on and lead to an augment in levels of these poisons which can pose a danger to the consumers of these crops [34]. Consumer advocates, especially those in EU countries, say that there is not enough research done to establish that GM crops arc safe to eat. These crops could carry strong toxins. Concerns for safety of GM foods have stirred the most passionate controversy among the public, and has led to boycotts, bans and protests as test in the recent World Trade Organization (WTO) meeting in Seattle, Washington, in late November 1999 as well as the USDA and Industry conversation in Chicago in early November 1999.

3.4. Potential allergenicity from GM foods

Genetic modification of food plants could exchange allergenic properties of the donor source into the recipient plant or animal. Moreover, many genetically engineered foods use microorganisms as donors whose allergenic potential are either unfamiliar or untested. As well, genes from non-food sources and modern gene combinations could trigger allergic reactions in some people, or exacerbate remain ones. GM foods containing informed allergens (like peanuts, wheat, egg, milk, tree nuts and legumes, crustacean, fish and shellfish proteins) could spark allergic reactions in capable consumers. The Pure Food Campaign, a food advocacy group based in Washington, DC, is anxious not only about nutrient loss and start of new toxins but also about allergens and potent side effects [35]. Pioneer Hi-bred International (a seed company now owned by Dupont) incorporated Brazil nut genes into soybeans to augment the protein content of its animal feed. This gene modification involving allergic reactions in consumers who were allergic to Brazil nut, so this product was voluntarily recalled [36]. The FDA does require food companies to exhibit through scientific data that potential allergens arc not taken any of their GM foods, and if they arc, the FDA demand label indicating that fact. Although the regulatory agencies, FDA and EPA, claim biotech companies to report presence of puzzle proteins in their modified foods, there is a concern that unknown allergens can slip by the system.

3.5. Environmental concerns

3.5.1. Unintentional gene transfer to wild plants

Environmentalists are worried that transgenic crops will recent environmental danger when they are widely cultivated [37]. Genetically modified crops having herbicide and insect resistance could cross-

pollinate with feral species, and unintentionally generate hardtop- eradicate super-weeds particularly in small farm fields surrounded by wild plants. This unintentional gene transfer, although difficult to substantiate, can have outcome that are not yet known [38]. These super-weeds can become invasive plants with potent to lower crop yields and disrupt natural ecosystems. Transgenic grains could also become weeds requiring costly and environmentally dangerous chemical control programs [39]. Opponents of GM crops want regulations to demand appropriate studies to assess the hazards of GM crops on the environment. They believe that at poison; for example, can threaten useful insects by entering the food chain.

3.5.2. Possible creation of new viruses and toxins

Plants engineered to carry virus particles as part of a strategy to increase resistance could facilitate the generation of new viruses in the environment. Plants engineered to obvious potentially poison substances such as drugs and pesticides will present danger to other organisms that are not intended as goal.

3.6. Limited access to seeds through patenting of GM food plants

Several critics of genetic modification argue that patenting which assume corporations to have monopoly control of genetically change plants or animals violates the sanctity of life [40]. Reviewer also oppose the fact that seeds which have been hugely known as commodity products are now think as proprietary products because of genetic modification.

Various critics view the ‘terminator gene’ technology as a monopoly and anti-competition. Terminator gene technology yield sterile seeds which will never germinate when planted. It forces farmers to purchase new seeds every year from multinational companies so that cultivator becomes subordinate on the multinational instead of sowing seeds from the previous year’s harvest. It is argued that this would demolish traditional farming practices. There have been some protests against the terminator gene technology in many developing countries, particularly India [41].

3.7. Threat to crop genetic diversity

Critics of genetic modification of foods alarm that commercialization of transgenic harvest will pose a new intimidation to crop genetic diversity already endangered by recent agricultural Practices that favor the worldwide acceptance of a few crop varieties. Genetic modification also minimize bio-diversity of the world's food supply by the use of 'terminator' seed technology which generate sterile seeds and controls seed supply particularly in developing countries.

3.8. Religious, cultural, and ethical concerns

Religious worry are also voiced as some of the cause for opposing genetic engineering of foods, while several people object to bio-engineered foods for personal, ethical, cultural, and esthetic reasons, as well as infringement on consumer choice, and disability to distinguish GM foods from non-GM counterparts. For example, Jews and Muslims may be aversive to crop that contain pig genes, and generally insist on Kosher and Halal foods whose integrity can be documented. Vegetarians may similarly object to vegetables and fruits that carry any animal genes [42]. Few people are eating plant foods containing human genes.

3.9. Concerns for lack of labeling GM foods

Various critics are concerned that GM foods are not labeled. They persist that labeling can aid the consumer trace unintended produce to a certain consumed GM food. In the United States, the safety and wholesomeness of food stocks (except meat and poultry) is regulated by the FDA, and this agency regulates biotech-derived products under its official policy on foods attained from new plant varieties [43]. With regards to these recent plant foods, summary information on safety and nutritional measurement shall be provided to the FDA, while a scientific presentation of data shall be made unostentatiously to the FDA scientists [44].

3.10. Concerns of animal rights groups and organic farmers

Animal rights groups are within the loudest opposition of generic engineering. They highly oppose any form of cloning or genetic engineering involving animals, or usage of animals in research and have occasionally resorted to vandalizing animal research facilities [45]. Organic farmer fear that GM foods would vague organic foods because of lack of labeling, and they feel that the biotech revolution could make it hard for people to locate non- GM crops. Organic foods are usually defined by consumers as those foods produced ordinary without toxic chemicals, drugs.

4. Discussion

Nutrient deficiency in the soil poses a big challenge to food production globally [46]. Genetically modified organisms (GMOs), also known as genetically engineered or transgenic organisms, for use as human foods or animal feeds are common place now a day's [47]. Sufficient regulation, constant monitoring and research are necessary to avoid possible harmful effects from GM food technology. The nutritional and health favor of genetic engineering are so many and will be useful to the growing world population which is currently calculated at six billion [48] and will possibly double by the year 2050, according to the UN. Therefore, genetic engineering is the only logical way of feeding and medicating an over populated world. In theory, thus, transgenic foods could serve as oral vaccines, capable of stimulating the immune system, via mucosal immunity, to produce antibodies [49]. Danger of producing and consuming new GM foods should be weighed against feasible benefits, and when profits outweigh the risks, such foods should be accepted. Indeed as pointed out by the former FDA commissioner, the people of the 21st century should initiate to get used to the emerging technologies of our times, be it microcomputers, information excellent highways, or genetic engineering. In the next 21 century food crisis fill up by GM foods in the world. This can be attaining through openness, education, and research.

Conclusion

Recently genetic engineering significant role play in the world through the use of genetic modification technique like GM crops. It would lead to promotion of new crop varieties that offer augment yields and reduced inputs, and also offer specialized traits that meet end user needs. Genes compacted into plants can give biological defense versus diseases and pests, thus reducing the need for costly chemical pesticides, and convey genetic traits that quality crops to better withstand drought, pH, frost and salt conditions. Use of herbicide resistant seeds wills capable farmers to selectively remove weeds with herbicides, without damaging farm crops. Genes for various traits (such as herbicide tolerance, insect resistance, slow ripening, etc) can also be stacked in a single seed, thereby exaggerate the seed's

efficiency [50]. Although some of the limitation of GM crops moreover it's positive effect and potential activity present in GM crops. From the study of this review article we suggested that GM foods can be accepted to us because it beneficial effect.

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Conflicts of Interest

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