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A UNIQUE APPROACH TO STUDY THE IMPACT OF GENETICALLY MODIFIED FOODS ON HEALTH

Sukhminder Singh

Chandigarh University, NH-95, Ludhiana - Chandigarh State Highway, Punjab.

Email: Sukhmindersingh92@gmail.com

Siddhartha Dey*

Chandigarh University, NH-95, Ludhiana - Chandigarh State Highway, Punjab.

Corresponding Author Email: deysiddhartha37@gmail.com

Kirti Sharma

Chandigarh University, NH-95, Ludhiana - Chandigarh State Highway, Punjab.
Email: academiciankirtisharma@gmail.com

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ABSTRACT

The purpose of this study is to analyze the impact of Genetically Modified (GM) food on human body, and also to determine the impact of genetically modified food on certain organs and people wellbeing. With this, researchers are also accessing the different beneficial genetically modified foods which are not harming human body. For achieving these objectives, we did a small survey on 300 respondents who belongs to hotel management industry. For collecting the data, we used the stratified random sampling in such a way that faculty of Various Universities, Students of Hotel Management and Hotel Industry are included. As today there is an increment interest in genetically modified foods which shows our concerns about GM food and diet which shows worries just as the restrictions of the methodology continued in the assessment of their wellbeing. Creature harmfulness contemplates with specific GM food varieties have shown that they may poisonously influence a few organs and frameworks. The survey of these examinations ought not to be led independently for every GM food; however, as indicated by the impacts applied on certain organs it might assist us with making a superior image of the conceivable wellbeing impacts on people. The consequences of most investigations with GM food sources demonstrate that they might cause some normal harmful impacts like hepatic, pancreatic, renal, or regenerative impacts and may change the haematological, biochemical, and immunologic boundaries. A greater part of the buyers had moral and moral questions about eating GM food varieties and didn't see credits like the better taste or lower cost useful enough to convince them to buy GM food sources. However, after doing research for few months in human toxicity it shows that genetically modified foods can cause the advancement of illnesses which are insusceptible to anti-microbial.

KEYWORDS: GMO Foods, Human body, Certain Organs, People Well-being, Harmful.

INTRODUCTION

A genetically modified organism (GMO) is one in which the transgene has been altered in a way that is not the result of repeated pairing and/or natural rearrangement, such as by genetic engineering. Genetically modified organisms (GMOs) have a variety of applications in biomedical research, as well as in the production of medicines and the field of investigative pharmacy . When an antibacterial drugs tobacco plant was used to create the very first genetically engineered (GM) plant in 1983, it was considered a breakthrough. When virus conferring resistance tobacco was introduced onto the market in the early late 1980s, China became the world's first nation to commercialize a transgene seed. Buyer approaches towards genetically modified foods (GMFs) seem to differ importantly through (and within) countries

Understanding the nature, crops and its impact on human health is important. Assumption of genetically modified (GM) herbicide charitable soybeans has prolonged quickly in the US meanwhile their overview in 1996, accounting for an appraised 44 percent of US soybean land in 1998 . The well-known use of soya as a chief in food processing - about 60% of treated foods have soya or soya derivatives - designates the possible possibility of the problematic. Additional nutrition products are also putting their impact on human health, for example, canned soup. Most pre-made soup contains GMO's. It is estimated that 70% of canned soup in 2018 will be from GM varieties (Western Producer, 1999). Conveyed eventual outcomes of tests for destructiveness and dietary soundness of complex staples are along these lines uncommon. Another typical in science portrayed this in its title.

Though, in GM sterilization the occupation of the normal quality is essential, the possible effects of these various characteristics need furthermore to be thought of as considering the way that various bits of the form or the incorporation of the vector could contribute liberally to the overall effect. There is a reality some confirmation that a part of various characteristics of the vector may influence security. This is particularly so as it is right now known to the point that DNA doesn't commonly isolate in the nutritious plot . In 1946, scientists made the ground breaking discovery that DNA may be transmitted across species .We now understand that DNA handover may take place via a variety of processes, and that they occur often in ecology. In addition, it is indeed a primary mechanism for resistant strains in harmful bacteria, among other things.

The United States Food and Drug Administration (FDA) granted approval for the hybrid 'Flavour Saver tomato' to be sold inside the country's grocery stores in 1994. Following collection, the tomato's maturing phase was regarded as a result of the disturbance to the environment. Even just a tiny minority of genetically engineered crops became authorized worldwide economic use throughout 1995, compared to today's quantity. As of 2011, the United States led a group of many nations in the development of genetically engineered plants. There are now a wide variety of different organisms that have a genetically engineered form (Johnson 2008). From 1996, a total of 35 permits have been given for the farming systems of eight genetically engineered crops but one blooming harvest of daisies having eight distinct features in six countries including the European Union (Clive 1996).

Genetically modified crops with genes that encode disease and insect resistance are claimed to reduce the need for broad-spectrum insecticides and herbicides in both the media and academic research. Because ploughing reduces greenhouse gas emissions, GM crops are considered favorable (replacement of energy-intensive by low-till agriculture). For those opposed to genetic engineering, the possibility of a worldwide ecological shift

is a source of great worry. Consequently, they are concerned about the long-term impacts of genetically modified agricultural production on diversity, which they think may lead to the spread of invasive high-yielding types and superpests, which would kill beneficial insects and alter the natural balance.

OBJECTIVES OF THE PAPER-

The Study aims to address three research questions/objectives:

1. To analyze the impact of Genetically Modified (GM) food on human body.

2. To analyze the impact of Genetically Modified (GM) food on certain organs.

3. To determine the different beneficial genetically modified foods which are not harming human body.

Researchers addressed them by performing a comprehensive literature review and building a conceptual model

(Figure 1).

LITERATURE REVIEW-

Using existing information on the human health and the environment dangers presented by genetically modified

(GM) crops, researchers performed a review of the current literature.

Both toxicity and allergic responses pose a threat to a person's overall well-being. On-target species may be injured, target creatures may grow resistant, and the ecological diversity of agricultural ecosystems may be compromised (). Mao and Feng classified risks to health, the environment, and society into three categories (2007). Food product benefits may also be distributed among individuals, and human society's values and beliefs may change as a result. In addition to the health and environmental risks previously mentioned, there are other social dangers.

Ecological risks allude to the impact and shock that genetically engineered food processing has on present society values and morals and ethics. During our investigation, we'll be investigating at a whole new kind of risk: ethical hazards. Adoption of transgenic agricultural technology implies "additional economic risks," which are related to the likelihood of monetary losses as well as trade risks and pitfalls. It is possible that the implementation of genetically engineered (GM) crops may bring with it new health, environmental, and market resistant issues. Consequently, market resistance concerns are just as important as economic dangers, and the authors predict that local farmers in developing countries will be disproportionally directly affected by a tiny proportion of transnational corporations that hold a stranglehold on genetically modified agricultural techniques

Customers' perceptions of possible threats resulting from genetically modified foods were measured using three indicators: "GM food is harmful to the environment," "GM food will sometimes cause allergies," and "GM agricultural production is exclusively for the profit of large corporations.

As a result, it is commonly understood that genetically modified crops are associated with a number of problems, such as health repercussions, environmental hazards, social and economic dangers, and so on.

Genetically altered foods have also been linked to a slew of problems. According to studies being conducted at the time of publishing of this report; socioeconomic hazards are presented by groups with a vested interest in keeping control of the economy. According to the most recent studies, there are a number of concerns associated with applying gene technology in food production. These dangers include, among other things, health risks, environmental risks, ethical risks, and economic changes (risks of being dominated by entrenched interest groups).

SOME REACTIONS TO GENETICALLY MODIFIED CROPS-

Figure 1. Generalized genetically modified foods are grouped into three types: Environmentally dangers, harm to human health, and financial troubles.

Environmentally dangers

- The breeding effort had an unintended side effect in that pollen from B.T. corn generated significant death rates in monarch butterfly larvae. Milkweed plants, not maize, are the primary food source for monarch caterpillars. There is concern that pollen from B.T. corn will be carried by the wind to milkweed plants in nearby fields, where the caterpillars would swallow the pollen and perish. B.T. toxins kill a broad variety of insect larvae.
- The effectiveness of pesticides has been reduced, and just as some mosquito populations were able to develop resistance to the now-banned pesticide DDT, many people are concerned that insects will develop resistance to B.t or other crops that have already been biologically intended to generate their own pesticides.
- Another risk is that agricultural plants modified for herbicide resistance and weeds would cross-breed, leading in the transmission of herbicide resistant strains from the crops to the weeds. This would result in the transmission of herbicide resistance determinants from the crops to the weeds. These "superweeds" would therefore be herbicide resistant as well, which is a win-win situation.

Harm to human health

- Literature was supplied that revealed that various d - galactose found in potatoes may very well have either detrimental or good effects (Friedman, 2006). The Ministry of Agriculture has stated that foods frequently contain naturally generated food contaminants or microelements, but that in natural proportions in regular diets, these toxins or micronutrients are acceptable for human consumption.
- Some secondary metabolites found in popular foods have been linked to possible risks, and as a consequence of this awareness, many individuals choose to avoid these foods completely or prepare them in such a manner as to eradicate any harmful compounds present, as seems to be the case with tapioca (Manihot esculenta). Another possibility is that a dangerous material was introduced into the cooking process during the preparation of food itself (for example, while deep frying tubers and toasting bread, the probable carcinogens ethanolamine's are being formed.). The amount of plant breeders screen for poisonous compounds that are typical of the botanical family on which a product was developed and exclude plants that have excessive levels of these toxic chemicals.

Financial troubles

➢ The act of incorporating genetically engineered products to the market is both time-consuming and expensive, and it may take many years to complete. The patenting of these innovative plant varieties has raised concerns among consumer advocacy organizations that it would raise the cost of seeds towards the point where small producers and consumers in poor countries will be unable to afford them Townsend, E., Clarke, D. D., & Travis, B. (2004). Given the farmers' claim that they unintentionally generated Agribusiness strains, it is probable that property compliance may be difficult. One technique for avoiding future patent infringement is to incorporate a "suicide gene" into genetically modified plants. These plants would be able to reproduce and produce sterile seeds that would not germinate in a single growing season if they were allowed to do so. Farmers would have to purchase new seeds on a yearly basis, which would be expensive. Producers of agricultural products, on the other side, would suffer financially as a result of this decision.

GENETIC MODIFIED CROPS

Bt. Cotton-

More over a fifth of the world's 35 million hectares of cotton are cultivated in India, making it the country's most significant fiber crop. Cotton was vulnerable to insects and pests before to the introduction of Bt. cotton; therefore, this technology is largely responsible for the success. Cotton accounts for roughly half of the $660 million in insecticides used annually across all Indian crops Discovered by Japanese scientist Ishiwata in 1901, Bacillus thuringiensis is found in soil all over the world. Certain Bt strains (Cry+) were shown to be very toxic to the larvae of several insect species that also pose a threat to crops. Bugs with neurotransmitter receptors in their intestinal membranes that attach to Bt proteins are killed by proteinaceous crystals seen in high quantities in Bt. Creatures without Bt protein receptors are totally resistant to the toxin molecules' toxicity. In recent years, advances in genetic transformation technology have allowed for the successful insertion of cry genes into plant cells, resulting in the manufacture of Bt proteins that are efficient in killing target insect larvae that infest crops. Genetically modified organisms (GMOs) may have unintended repercussions for the environment, animal and human health, among other things. Among the concerns are the creation of new pathogens, the spread of new viruses, the emergence of antibiotic resistance in microorganisms, the harm caused to non-target species, the loss of crop variety, and the introduction of new weeds. As a transgenic commercial crop, Bt cotton is an excellent choice. Cotton seed oil, which is often used in cooking, does not contain any proteins, including Bt proteins.

Golden Rice

Vitamin A is produced in the body as a result of the presence of beta-carotene, which gives carrots their brilliant orange colour. Vitamin A deficiency, on the other hand, affects around 250 million people throughout the globe. As a consequence, every year, half a million children are diagnosed with vitamin A deficiency, with more than half of them dying within months of being diagnosed. Diets rich in fruits and vegetables, which contain high concentrations of vitamin A and other nutrients, would be considered optimal in this regard.

Among children under the age of four, better nutrition has the potential to save up to two million lives per year. It will need more money, which is still a long way ahead, for the majority of the world to attain this. According to estimates, about half of the world's population consumes white rice, which lacks vitamin A, on a regular basis. Rice might be made more nutritious, which

could have a substantial influence on people's health. Carotene in golden rice has been shown to be a readily absorbed form of vitamin A in the human body, which makes it a valuable dietary source.

Potatoes

A number of countries have been unable to provide vaccines because of financial constraints. Due to the inability to refrigerate vaccines and needles in clinics, they must normally be kept at room temperature in storage. Because of these concerns, it is very difficult to ensure the safety of millions of children. The majority of vaccines are created in such a way that the infectious organism that causes the specific sickness is used in their creation, as a consequence of this development. The World Health Organization (WHO) established a worldwide competition in 1991 to find a more efficient and safer technique of immunization that was also more cost-effective.

A brainstorming session centered on plants was initiated by a group of scientists. However, it is currently unknown how plants may be reprogrammed in order to produce vaccines that are both safe and palatable to the public. Food insecurity is at an all-time high, and the use of genetically modified (GM) foods has been linked to a wide variety of disorders, including but not limited to autism and infertility, in recent years

T Brinjal

GEAC approved Bt brinjal, the world's first commercially available genetically modified crop, at the tail end of the first decade of the twentieth century, marking the first time a genetically modified crop had been approved for human consumption in India. Bt brinjal was the world's first commercially available genetically modified crop and India's first commercially available genetically modified crop. A careful review of the papers revealed that Mahyco, which employs biotechnology to generate large-scale, pest-resistant crops, had gotten approval for its proposed project. It is necessary for Bt Brinjal to have a gene from the soil bacterium Bacillus thuringensis introduced into its genome in order for it to manufacture the protein Cry1Ac. A frequent insect that infects brinjal is the shoot and fruit borer (SFB), and this protein works as a toxin against it In addition, two antimicrobial resistance indicator genes have been inserted into the genome of the organism. As a result, the facts given may raise some concerns regarding the safety and acceptability of genetically modified food, as well as provide some credibility to the many consumers who aren't yet ready to embrace food that has been made utilizing gene engineering techniques.

THE RISK OF GENETICALLY MODIFIED ORGANISM ON HUMAN HEALTH

It has been shown that genetically modified foods are related with significant health hazards, which include infertility, immunological issues, accelerated ageing, insulin regulation, and changes in the structure and function of key organs as well as the gastrointestinal system.

GMOs are by their nature Dangerous-

For a variety of reasons, genetically altered plants are particularly dangerous to humans. The first is that the process of genetic engineering, regardless of which gene is used to create the products, results in unforeseen alterations to the final product. As a result, mutations occur both at and around the insertion site as well as at other locations. In spite of the fact that the biotech industry had been convinced that gene transfer from genetically designed meals was impossible, a single human feeding trial on genetically modified foods

has shown that it is indeed conceivable. It was discovered that genetic material from soybeans that makes them herbicide resistant has been integrated into the DNA of human gut bacteria, enabling the bacterium to live. In other words, even if we stop consuming genetically modified crops, the foreign GM proteins generated by the crops may continue to be produced in our intestines.

GM Food Spectacles Digestive Reactions

Toxicity tests on the FlavrSavr tomato, which was the first crop ever submitted for voluntary consultation to the FDA (Food and Drug Administration), indicated that it carried toxins. Following the feeding of the GM tomato to twenty female rats, seven of the rats developed stomach ulcers, according to the research. It has been reported that specific forms of stomach ulcers connected with tomatoes might cause life-threatening bleeding in the elderly, particularly those who are using aspirin to prevent blood clots. Considering that the digestive system is the first and most important site of interaction with foods, Dr. Pusztai thinks that the digestive system is likely to exhibit a broad variety of toxicity implications and should be the major focus of risk assessment for genetically modified foods. Rats fed potatoes that had been engineered to produce a novel kind of insecticide showed signs of proliferative cell formation in both the stomach and intestinal walls, according to the findings (GNA lectin derived from the snowdrop plant).

GMO Food damages liver

Rats administered GNA-containing potatoes had smaller and partially atrophied livers. In rats fed Monsanto's Bt-toxin-producing Mon 863 maize, liver lesions and other poisoning signs were seen. When fed genetically engineered soy, rabbits' liver enzyme production and metabolic activity were changed. It was discovered that rats fed Roundup Ready soybeans had morphological alterations in their livers.

The death rates and organ failure in GMO foods living creatures were higher-

It was discovered that the pancreas of mice administered Herbicide had abnormal cells. The pancreas of rats fed a genetically modified potato became larger Ready soy has undergone significant alterations and now generates far fewer digestive enzymes. Numerous studies have shown that animals given genetically modified foods acquired kidney lesions, toxicity, changed enzyme synthesis, and inflammation. Genetically modified soy affected enzyme synthesis in mouse hearts, but genetically modified potatoes slowed brain development in rats.

Embryo motility & fertility malfunction

The ovaries of mice and rats given rise to the challenges soybeans have been shown to be dramatically changed. Instead of being pink, the organs of rats were a dark blue colour .It was observed that the sperm cells of young mice had been changed in some way. Results demonstrated that GM soy-fed mouse embryos had temporary changes in DNA function when compared to mouse embryos whose parents were fed non- GM soy, which was in agreement with previous findings (Landrum, A. R., Hallman, W. K., & Jamieson, K. H., 2019).

Gene-modified foods (GM crops) may trigger immune reactions and may even cause allergic reactions-

When something is seen by the body as foreign, unexpected, or hostile, the immune system responds appropriately. All genetically modified foods, by definition, include an unusual or unique ingredient .Many investigations have demonstrated that they really cause responses. Rats' immune systems were slower to react to genetically engineered potatoes than those

of other species. GMO peas also caused inflammation in mice, indicating the possibility of severe allergic responses in humans if eaten in sufficient numbers. Gene-modified soybeans include an additional protein that's resistant to herbicides, possibly a byproduct of the genetic engineering process. For the first time, scientists have discovered that an unusual protein may bind to Ige antibodies, which might cause severe allergic responses in certain individuals. As a method of pest management, organic farmers and others have used treatments containing naturally occurring Bt bacteria. In the end, they die because of the toxin's effect on their stomachs, which causes holes to develop. It's possible to put a gene that creates a toxin in bacteria into the DNA of crops through genetic engineering . This allows plants to do the work instead of the farmer. Every time we eat a piece of Bt corn, we're taking a risky chemical into our system. It has been proven that the natural Bt-toxin may interact with mammals in studies, despite the fact that it is completely eliminated after digestion.

The version derived from plants is more powerful than the original in order to be more deadly than the original. The Bt protein found in genetically modified maize varieties, like the GM soy protein, has a portion of its amino acid sequence that is related to an allergy trigger (egg yolk), making the protein resistant to digestion and heat. If Bt—toxin causes allergic responses, the transfer of genes might have far-reaching repercussions. If Bt genes are introduced into our gut flora, it is possible that our bacteria may transform into living pesticide factories. This might result in the creation of Bt-toxin in our bodies throughout the year.

RESEARCH METHODOLOGY

The Study was based on an online survey in Northern Indian region using a structured questionnaire. The survey was conducted through a self-administered questionnaire.

In this study, researchers proposed the conceptual framework Fig. 2, it was shown that the independent variable of the study is Genetically modified Food and seeing whether it put any impact on certain organs of the human being and also on human well-being (dependent variable).

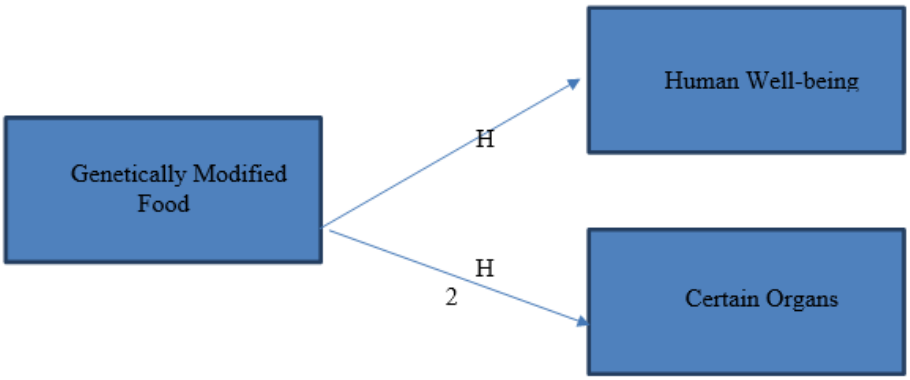

Figure 1. Proposed framework

Data were collected from 300 respondents by using stratified random sampling in such a way that faculty of universities, students of hotel management and the employees of hotel industry were included. It was mentioned in Hair et al., (1998) book that in this study we have 3 main variables and approximately 3-4 statements were constructed for each. So, in total we have 10 statements. The rule said whatever value

(10 statements) we got, just do ten times of it. So, according to this, the minimum sample size was 100, but for the more accuracy of the data, we took responses from 300 respondents.

In this study, researchers used primary data collection method as researchers send the questionnaire to respondents whosoever is belonging to hotel industry in any way.

RESULTS AND ANALYSIS

With the help of using SPSS, results and findings has been observed. A) Demographic Profile of respondents (Figure-2) and (Table- 1).

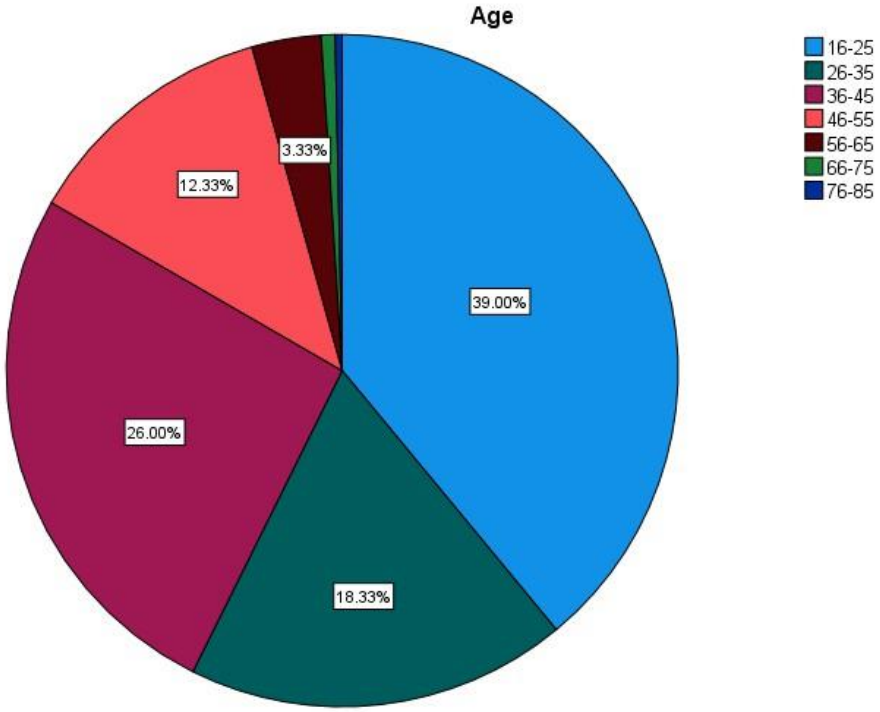

Figure 2. Age of respondents

In figure- 2 we can see that more than 40 different age group people has been filled the questionnaire.

TABLE 1. Organizations of respondents

Organisation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Faculty of Universities	180	60.0	60.0	60.0
	Hotels	120	40.0	40.0	100.0
	Total	300	100.0	100.0	

Table-1 Shows that 180 no. faculty from various universities and 120 hotels and restaurants employees have responded.

B) Have you heard about Genetically Modified food Before? (Figure 3)

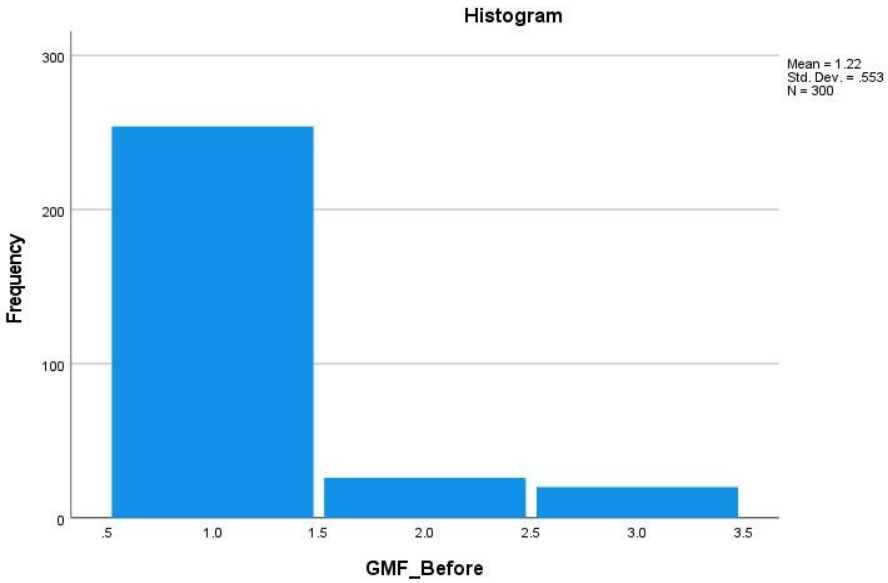

Figure 3

C) Are You aware about the health risks associated with GMO Foods? (Figure - 4)

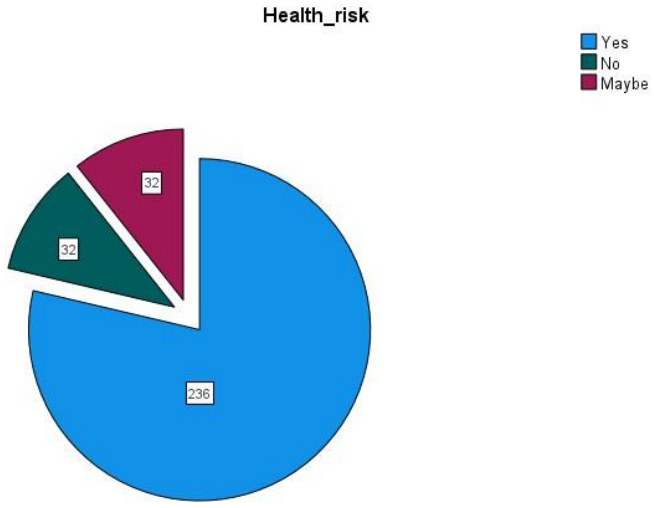

Figure 4. Shows that out of 300 respondents, 236 people were aware about health risks and 32 respondents have no idea about the same whereas 32 respondents are not sure regarding the health risks with GMO foods.

D) Do You think eating an abundant amount of GMO food will leads us to death? (Figure- 5)

Abundant

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	198	66.0	66.0	66.0
	No	32	10.7	10.7	76.7
	Maybe	70	23.3	23.3	100.0
	Total	300	100.0	100.0	

Figure 5.

As you can see clearly that figure 5 indicates that eating large amount of GMO foods leads us to severe diseases and also to death. Out of 300 respondents 198 says yes, 32 numbers are in favor of no. While, 70 respondents are not sure.

E) What are the main issues of concern for Human health? (Figure- 6)

Human_health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Allerginicity	253	84.3	84.3	84.3
	Geine Tranfer	24	8.0	8.0	92.3
	Outcrossing	7	2.3	2.3	94.7
	Feasibility	16	5.3	5.3	100.0
	Total	300	100.0	100.0	

Figure 6.

Figure- 6 indicates that out of 300 respondents 253 are in favor of allergenicity while others are for Gene transfer, outcrossing and feasibility.

F) Should we cultivate organic food instead of producing GMO foods? (Figure- 7)

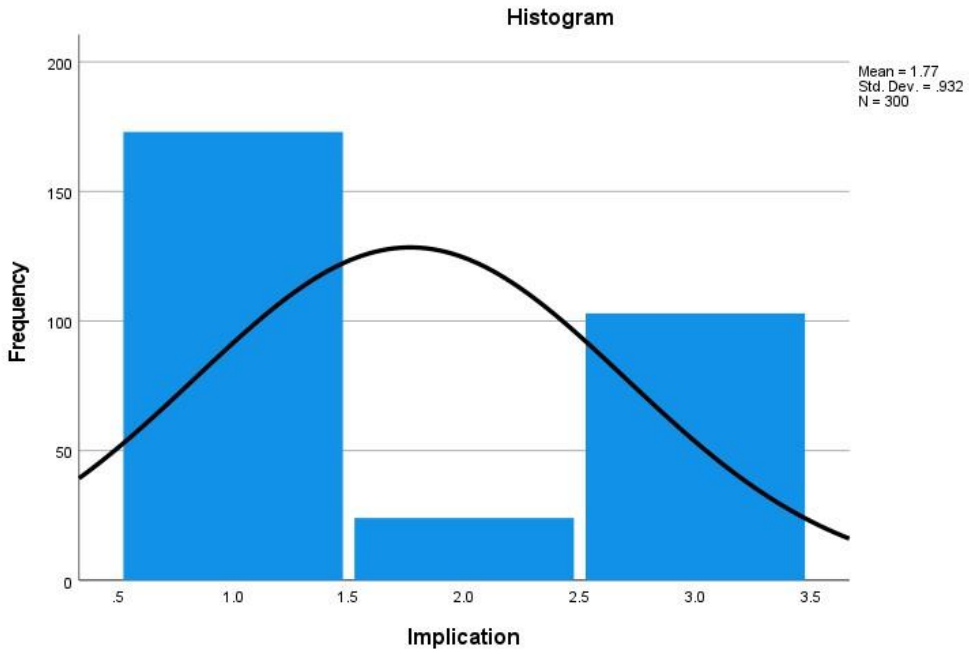

Figure 7.

Figure- 7 Shows that 57.7% of people are in favour of cultivating organic food while on the other hand 8% are not, 34.3 % are neutral.

G) What Further developments can be Expected in the area of GMOs? (Figure- 8)

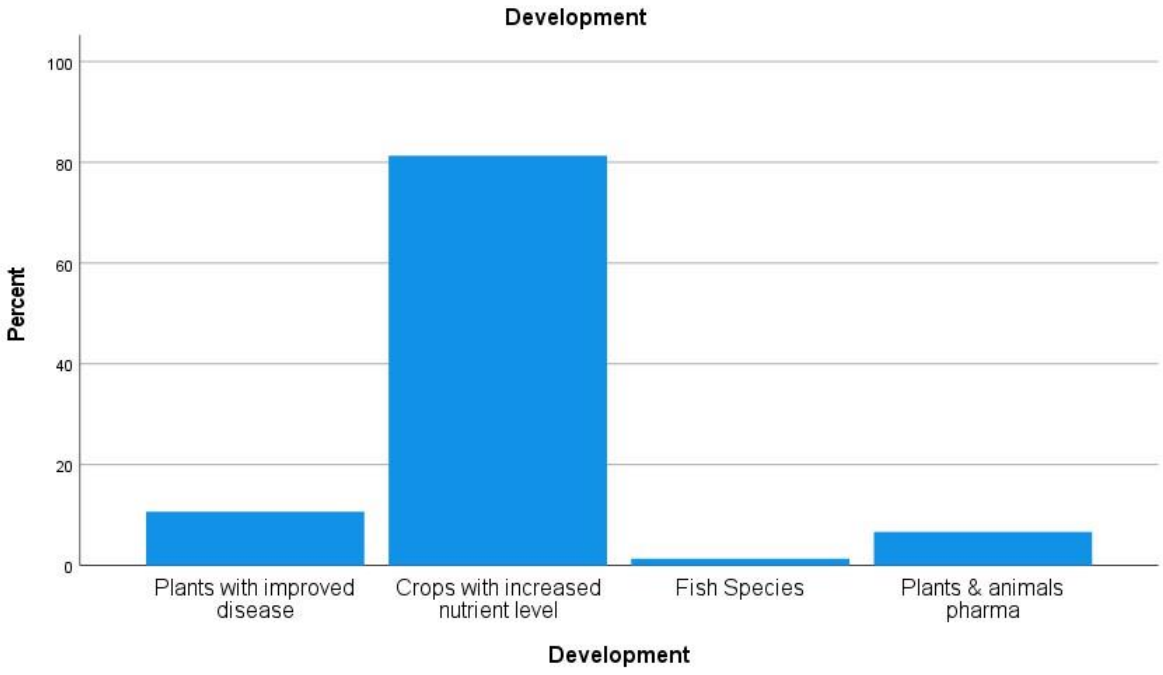

Figure 8.

Above figure shows that 244 respondents are asking for increased nutrient level, 32 for improve in plant, 20 for plant and animal pharma.

H) Have you eaten foods made from genetically modified Crops? (Figure- 9)

Eaten_foods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	92	30.7	30.7	30.7
	No	42	14.0	14.0	44.7
	Maybe	166	55.3	55.3	100.0
	Total	300	100.0	100.0	

Figure 9.

It shows that many of the them have eaten GMO foods with 30.7% yes, 14% who have not eaten and 55.3% don't know about the same.

I) What are the current benefits of having foods made from genetically modified crops? (Figure- 10)

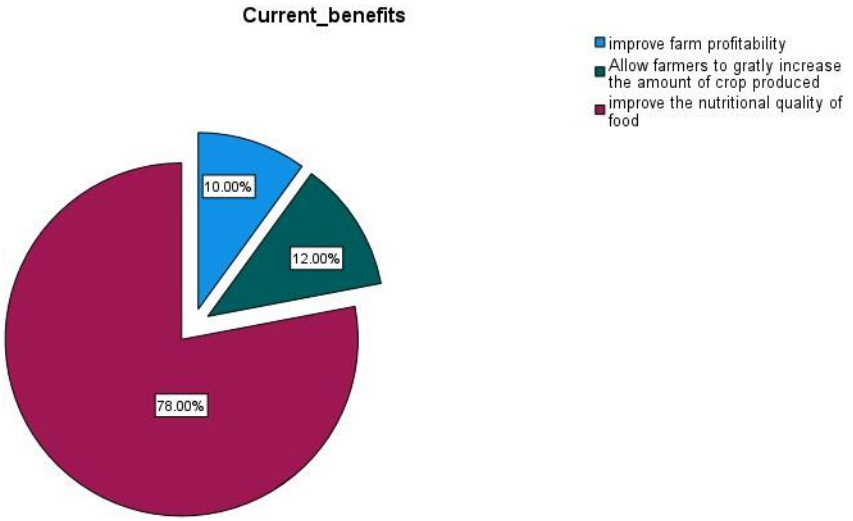

Figure 10.

Figure- 10 shows that 78% said it improves the nutritional quality of food while 10% thought it improve farm profitability and 12% are in favour of increase in amount of Crops.

J) What effect does eating genetically modified food have on your genes? (Figure- 11)

ANOVA

Effect

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39.992	42	.952	1.371	.074
Within Groups	178.555	257	.695		
Total	218.547	299			

Figure 11.

As it is clearly mentioned In above Anova figure indicates that eating food in different age groups does not affect human body and it will not lead us to dangerous health diseases.

K) Is food derived from GM Crops required to be tested for possible allergic reactions in people? (Figure- 12).

Food_derived

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	249	83.0	83.0	83.0
	No	51	17.0	17.0	100.0
	Total	300	100.0	100.0	

Figure 12.

In above figure it shows that 249 respondent's believes that it should be tested for possible allergic but 51 are opposing for the same.

CONCLUSION

It is possible that genetically modified crops will have both beneficial and harmful effects on the ecosystem. Genetically engineered foods, on the other hand, are consumed by everyone on a regular basis. Due to the fact that it is being utilised to give healthy and nutritious food to the great majority of the world's people, it is becoming more popular. The positive effects of its use have so surpassed the negative effects of its use, and it is now used all over the world. We are aiming to make more genetically modified foods in order to increase the desired qualities in the food via the use of a gene modification technique since it has a higher beneficial influence on people than it does harm. It is possible to use genetically modified foods in a safe and healthy manner while also decreasing their harmful influence on the environment thanks to a number of regulations in place today. Many of the world's hunger and malnutrition problems might be addressed by genetically modified crops, and increasing production could also benefit the environment by reducing pollution and conserving resources.

Biotechnology advances such as molecular biology, genetic engineering, and transgenic technology, among other improvements, offer a very wide range of potential applications in food production, including microbes, plants and animals. Genetically engineered foods may have both favourable and detrimental effects on human health. There are several benefits to using genetically modified crops. These include high yields as well as cold, drought and salt tolerance as well as insect resistance, herbicide and disease resistance, nutritional improvement, medicinal properties, and phytoremediation activities, among other things. Foods that have been transformed genetically have a variety of negative consequences for living beings. Examples of negative outcomes include environmental threats, health difficulties, economic concerns, and legal challenges. Among the most important potential health risks associated with genetically modified foods include toxicity, allergenicity, and genetic hazards, which are listed as follows: The inserted gene and its expressed protein sperse, secondary or pleiotropic effects of the products of gene expression, and the likelihood of endogenous genes being disrupted in the transformed organism are the most likely origins of these side effects in the modified organism. Many countries are currently engaged in the development of biosafety regulatory regimes in order to govern the transboundary movement of genetically modified organisms in order to mitigate the potential hazards that these organisms may pose to biodiversity, human health, and the environment in general.

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