A Study on the Validity of Perceived Risks versus Benefits of Genetically Engineered Foods among US Consumers

Gaganjot Kaur

Assistant Professor, Apex Institute of Technology, University Business School, Chandigarh University, Gharuan - Mohali (Punjab)

**MHA, M.Pharm*

Abstract: This paper evaluates the validity of risks perceived by US consumers about genetically engineered foods. There is a lot of skepticism regarding the safety of such foods aggravated by media debates surrounding the seeming harms. Farmers producing genetically manipulated crops claim multiple benefits of the produce. These benefits being protection from viruses and insect pests, enhanced nutritional value, better taste and a longer shelf life. But the consumers are apprehensive of these purported benefits. They consider it a threat to the human health. Their reason being possible change of gut flora resistant to standard antibiotics as these antibiotics may be used in many genetically modified foods. Some consumers also think that such foods are artificial and trigger metabolic toxicity. The burden of dispelling the fears not only falls on the producers of genetically modified foods but also on scientists and food regulatory agencies. Political institutions in the country also have a role to play.

Key Words: *Genetically engineered foods, food processing industry, genetic manipulation, nutritional value*

Introduction: In the US, 70% to 85% of all processed foods contain genetically engineered ingredients (Chassy, 2002). With such a high dependence of the food processing industry on the

modified food ingredients, it has to be evaluated if these foods are as safe for the consumer as their traditional counterparts. There is an incomplete understanding about the associated risks of this new technology which has led to a lot of skepticism. At the same time there is a potential for huge gains for both the producers and the consumers in the long run.

Definition of genetically engineered foods: As per the US National Library of Medicine (NLM) and National Institutes of Health (NIH), "Genetically engineered foods have had foreign genes inserted into their genetic codes"

Regulation of plant biotechnology: There are four federal regulatory entities which oversee the safety of genetically engineered foods. These are National Institutes of Health (NIH), Animal Plant Health Inspection Service (APHIS) of the USDA, Food and Drug Administration (FDA), and Environmental Protection Agency (EPA) (Falk, C., et al. 2002). An example of FDA authority through stringent evaluations is that it is can prevent the commercialization of a new crop if it finds that the levels of nutrients in the genetically engineered foods are altered (Kaeppler, 2000).

Objectives:

This paper aims to evaluate if the benefits associated with consumption of genetically engineered foods do or don't surpass the potential risks debated upon by the public.

Advantages of genetically engineered foods*:* Farmers have been producing genetically modified food crops like corn, soybeans, potatoes etc. since mid-1990s. Even genetically modified ingredients like enzymes found in breads, cheeses and beers have long been in use. Producers extol the many advantages of such foods. The most notable example is the modification of corn. The plant is engineered to produce proteins usually produced by soil bacterium called *Bacillus*

thuringiensis. These proteins have the capability of harming the insect pests but do not harm humans and animal life (Falk, C., et al. 2002). Other crop examples which have been engineered to give immunity from viruses and pests are tomato, potato, squash and papaya (Falk, C., et al. 2002). Besides imparting defense to these plants, the nutritional value of some plant foods has also been enhanced. For example, a strain of rice engineered with increased iron and beta-carotene levels is beneficial to the people in developing countries who suffer from malnutrition and blindness (Falk, C., et al. 2002). Future advances foreseen are production of vaccines in plants through the expression of antigen proteins (Falk, C., et al. 2002).

For various reasons, crops modified by genetic engineering technique have been beneficial for both the producers and the consumers. These are enhanced yield for the producers due to protection from viruses and insect pests and better taste, longer shelf life and enhanced nutritional value of foods for the consumer (Falk, C., et al. 2002). As stated above, incorporating pest protective proteins in the crops reduces the need for harmful pesticides and fertilizers. This not only reduces the investment in crop production but also makes the crops safer for consumption. Other safety benefits include safety of farmers from handling harmful chemicals and soil safety from continuous assault of harmful chemicals in the form of herbicides and pesticides which seep down into the ground water and make the ground water unfit for consumption. Most importantly, as listed above, the presence of food regulatory agencies ensures that all genetically engineered foods pass stringent safety criteria before being commercialized.

The challenge to safety of genetically engineered foods is almost non-existent (Chassy, 2002). Challenges exist on other fronts. For example, if crops are produced beyond a consumable limit, it becomes an economic problem because the producer has to discard the excess resulting in reduced profits (Falk, C., et al. 2002). In rich countries, the government spends roughly $1

billion per day in the form of subsidies to the farmers to stop them from producing surplus and retaining profits (Timmer, 2003).

Methodology: The study is descriptive in nature. The data is collected from various secondary sources such as websites, books, magazines, newspapers, reports and by listening to media debates on mass media.

Findings: Despite the many advantages of genetically engineered plants, there is a mixed reaction to their consumption. Unfavorable reactions arise due to the lack of public awareness regarding the scientific techniques used in safe production and the function of regulatory agencies in ensuring the safety of these foods. The common consumer perception is that the genetically engineered foods are unnatural or unhealthy (Timmer, 2003).

It is a known fact that introduction of new technology has always been received with skepticism by the public. It takes years before the public accepts a new technology. The same is true for the genetically engineered foods. People have always suspected if these are as safe as the traditional foods. This fear is further heightened by the hype generated by media debates. The debate on safety of genetically engineered foods is superfluous due to many reasons. Firstly, genetically engineered foods have to pass through various regulatory inspections conducted by at least four agencies (listed above) before they are marketed. Secondly, genetic manipulation in the form of cross breeding has been in existence since centuries with no harmful effects seen. (Falk, C., et al. 2002). Thirdly, no incident has been reported on toxicity after ingestion of genetically engineered foods (Chassy, 2002). Moreover, these external genes are not taken up by

the mammalian genome; rather they are hydrolyzed and digested in the human gastrointestinal tract (Chassy, 2002).

Hence, there are more benefits than risks involved. Or put differently, if we tally up the negative and positive consequences of the production and use of genetically engineered foods, the net benefits outweigh the risks associated with this action resulting in larger good of the public. According to Stone, D. this concept is called "maximum total welfare" (Stone, 2002).

Conclusion: Educating the public on the safety of genetically engineered foods will be a challenge in the coming future. Both scientists and food regulatory agencies have the expertise to dispel public fears. If political institutions get in partnership with them, together they can counter the misinformation attached to fears regarding food safety in the people's minds.

The benefit of food protection from viruses and insect pests, better taste, longer shelf life and enhanced nutritional value is much more to the producers and consumers as stakeholders than the unsubstantiated fears of public on the food safety. Hence, there is more benefit attached to the production of genetically engineered foods than any probable risks.

References:

Chassy, Bruce M. (2002). Food Safety Evaluation of Crops Produced through Biotechnology. *Journal of the American College of Nutrition,* 21(3), 166S-173S.

Falk, Michael C., Chassy, Bruce M., Harlander, Susan K., Hoban, IV, Thomas J., Mcgloughlin, Martina N., Akhlaghi, Amin R.(2002). Food Biotechnology: Benefits and Concerns. *The Journal of Nutrition,* 132, 1384-1390.

Kaeppler, Heidi F. **(**2000). Food Safety Assessment of Genetically Modified Crops. *Agronomy Journal*, 92, 793-797.

Stone, Deborah A. (2002). *Policy Paradox: The Art of Political Decision Making*, W.W. Norton & Company, Inc. Chapter 10: Decisions, pp.234.

Timmer, C. Peter (2003). Biotechnology and Food Systems in Developing Countries. *The Journal of Nutrition,* 133, 3319-3322.

U.S. National Library of Medicine and National Institutes of Health (2007). Medline Plus. *Genetically engineered foods*. Retrieved Dec. 1, 2007, from the webpage: http://www.nlm.nih.gov/medlineplus/ency/article/002432.htm