

Disadvantages of gm food



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Abstract

This report strives to provide an insight upon the numerous disadvantages of GM food and crops pertaining to humans and the environment. The fundamental core of this report concerns the human health risks posed by the consumption of GM food by the community. Safety tests for GM foods are scant and sparse, and toxins as well as allergenic components in these GM foods are unpredictable. Alternatively, GM crops prove to be disparaging to the environment. As a result of GM crops being grown, GM “superweeds” exist and the earth’s biodiversity is disrupted. Conversely, GM crops incur substantially high costs. Cost of seeds for GM crops is excessively priced and agri-biotechnological companies stand a chance to abuse this cost in order to reap more profits.

1.0 Introduction

Genetically modified foods, otherwise recognized as GM foods, pertain to crop plants or animals engineered for consumption through the application of the latest techniques for molecular biology (Whitman, 2000). Desired traits and characteristics such as increased resistance against pests and improved nutritional content are expressed through the modification of these plants in laboratories. Newly improved crops have been known to demonstrate resistance towards pests, require less water, and generally thrive as well as develop in less than optimal growing environments. Genetic engineering was first discovered in the year 1983, and since then has been utilized for the potential benefit of mankind.

However, GM foods have made an impact on the world as it is today. As avowed by Whitman (2000), GM foods have been actively protested against

by environmental organizations in Europe and public interest groups for months, and the matter of genetic manipulation has been propelled to the vanguard of public awareness by contemporary disputable studies regarding the effects of genetically-modified corn pollen on monarch butterflies. In the United States of America, research has proven that in the year 2001, more than 60% of processed foods in the country contain bio-engineered foodstuffs such as genetically-modified soybeans and corn (Sakko, 2002).

Though there are many queries regarding the safety of such GM foods, in addition to its advantages and disadvantages, the actual question arising from such an issue remains evident: Should GM food be banned for the benefit of mankind?

Despite claims that GM food is beneficial to human health, environmentally friendly and its benefits outweigh its disadvantages; GM food should be banned for the greater good as it evidently poses human health risks, is environmentally hazardous, and is costly.

This report exposes the disadvantages and adverse effects of GM foods on humans as well as the environment. The scope of this report is global, as GM foods are present in almost all countries around the world and GM crops are on the rise in replacing conventional crops in order to conform to the needs of humans.

2.0 Human Health Risks

Many shortcomings arise from the consumption of GM foods. First of all is the endangerment of human health. It is possible that by introducing foreign genes into the genetic make-up of a plant may result in unexpected and

negative impacts upon the wellbeing of humans. As the application of genetic engineering is relatively new to the human society, there is inadequate scientific study regarding the many dangers to health caused by GM foods, and safety test technology is insufficient in gauging the potential dangers to humans. Aside from that, GM foods may carry within themselves unpredictable toxins and might possibly increase the threat of allergenic reactions.

2. 1 Scarcity of Safety Tests

Knowledge regarding health risks due to GM foods is sparse. As affirmed by Domingo (2000), many opinions exist concerning health risks of genetically modified foods. However, actual publications and information on GM food toxicity remains scarce. It is relatively harder to appraise the safety of foods originating from crops compared to individual chemicals, food additives, or drugs. This is because of the genetic composition of crop foods that is much more complex, and may vary in accordance to discrepancies in growth and agronomic conditions.

An example of this is the initial and sole assessment of a GM fruit, the FLAVR SAVR tomato, as assigned by Calgene. This GM tomato was cultivated through the insertion of kanr genes into a tomato by an “ antisense” genetic modification method. Outcomes asserted that no major differences in overall mineral and vitamin as well as in toxic glycoalkaloid levels were observed. Hence, the GM tomatoes are considered to be as harmless as their parent tomatoes (Pusztai, 2001). This is undeniable that the safety test in regards to the safety of the FLAVR SAVR tomato is oversimplified, and does not encompass all aspects of how a safety test should be. As such, the safety

test is defectively planned and executed, rendering the conclusion that the GM tomatoes were safe implausible.

2. 2 Unpredictable Toxins and Allergenic Components

Unwanted consequences can also be a result of the insertion of genes into the genetic make-up of GM crops, as some of the ways and methods the incorporated genes express themselves or the way they affect the exhibition of the genes of the crop are evidently random and mostly erratic. This could result in the production of unfamiliar toxins and allergenic components when consumed unknowingly.

This is as evidenced in a toxicity test done on mice. Mice were fed with GM potatoes induced with a *Bacillus thuringiensis* var. *kurstaki* Cry1 toxin, a toxin imbued within the genetic composition of the potato for the sake of repelling insects. This was shown to have caused villus epithelial cell hypertrophy and multinucleation, disrupted microvilli, mitochondrial degeneration, increased numbers of lysosomes and autophagic vacuoles and activation of crypt Paneth cells in the mice (Pusztai, 2001). These results still manifest despite claims of the contrary by its producers and manufacturers, resulting in widespread confusion and fear within its consumers.

In another case, a proposition to splice a gene originating from Brazilian nuts into soybeans was rejected due to the trepidation of resulting in unforeseen allergic reactions. GM food derived from modified GM crops is known to trigger new allergies through the synthesis of new proteins by the imported genes introduced. Almost all food allergens are protein-based, and they are likely to be comparatively small and resistant to heat, acid and stomach

enzyme degradation (Chow, 2009). Although crops frequently used as staple foods contain thousands of dissimilar proteins, relatively few are known to be allergenic. Though so, their allergenic potential might have been altered through the use of genetic engineering, rendering even foods not generally known to instigate allergies to do so. Should a host plant be noted to express allergenic properties, bringing in new genes into its genetic make-up could actually lead to the allergenic proteins being over-expressed, making the plant more allergenic.

Beneficial to Human Health

Proponents of GM foods constantly assert that GM foods are beneficial to human health. They contend that GM foods possess medical advantages, and are able to be modified to make edible vaccines. However, this argument is inadequate. GM foods are still being researched on, and the assumption that they are able to function as supplements is dangerously over-rated. Data and information regarding the effects numerous types of GM foods are insufficient, in spite of everything that those who support the commercialisation of GM foods state. Should GM foods be released to the population without proper examination and regulation, many lives would be endangered, in contrast to what is as claimed due to the unknown effects of many allergens to the human body. As such, GM foods are actually detrimental, and should not be acclaimed to be advantageous to human health when it has not been proven to be so.

3.0 Environmentally Hazardous

Additionally, another disadvantage due to the cultivation and breeding of GM crops is the risks it poses to the environment. Numerous environmental

activists and advocates of the environment have all made known their concerns and apprehensions regarding the threat GM crops create for the ecosystem. Tempering the genetic make-up of crops to produce GM food might consequently result in the manifest of GM “ Superweeds. Also, the biodiversity of the environment will be altered or could potentially be disrupted at a larger scale.

3. 1 Creation of GM “ Superweeds

Crops genetically manipulated to be able to generate their own pesticides or to be herbicide-resistant pose a dangerous danger to the environment. These crop plants altered genetically to be tolerant to herbicides and pesticides might cross-breed with the local flora, causing the herbicide-resistant genes to be transferred from crop plant to weed. As avowed by Cummins (1999), the growing of these GM crops will inevitably ensue in the emergence of weeds that are resilient to pesticides and herbicides, resulting in the need for stronger, more potent forms of toxic chemicals to liberate the pests. These “ superweeds’ will then be a menace to the GM crops in turn, and even to the environment as a whole.

This is as illustrated by the emergence of the first “ superweed”, a plant that can’t be killed by almost anything, in Canada. A single canola plant in Ottawa was discovered to be resistant to numerous types of pesticides (gmwatch.org, 2001). Canola plants contrived to help farmers in increasing their productivity had instead escaped and cross-bred with one another to produce offsprings that are even more resistant than their parents. Most pesticides weren’t able to exterminate these super canola weeds, which

were wrecking havoc in wheat fields and other prospective areas in which farmers don't want them to grow in.

3. 2 Disruption of Biodiversity

The notion of biodiversity denotes the wide variation of organisms in a given ecosystem. Numerous interactions between these organisms keep the biodiversity of an environment high, and when disturbed will result in an often adverse if not disadvantages effect to the particular ecosystem. Wild type plants in an area will typically be overwhelmed when a GM crop is planted in its vicinity due to the superiority and better adaptation of the crop to its environment compared to the wild type plants. The GM crops will then be competing with the wild type plants for essential resources like light, water, and important nutrients in the soil for survival, and will most likely prevail. The subjugated wild type plant will then either be extinct or be wiped off from that area. This will then indirectly affect the survival of other organisms that might have relied on the wild type plant for food, shelter, or protection.

For instance, research has proven that the plantation of a GM plant, B. t. corn resulted in a high mortality rate in monarch butterfly caterpillars (Whitman, 2000). Unfortunately, the ideal conditions for the plantation of B. t. corn coincides with that of the milkweed plant, which is the staple food for monarch butterfly caterpillars. Milkweed plants were unable to compete and were wiped off in large amounts due to the prevalence of B. t. corn in the ecosystem. This caused monarch butterfly caterpillars to perish in significant numbers owing to insufficient food supply. Hence, this perfectly illustrates the adversity of GM crops to the environment.

Can Be Engineered to Maintain Quality of Soil

Supporters of GM food relentlessly insist that GM crops are able to be genetically altered to maintain the quality of the soil regardless of the nutrients required. They claim that akin to herbicide-resistance, GM crops can be engineered to return the nutrients it derives from the soil, to the soil, thus sustaining the nature of the soil. However, this assertion is derisory. In fact, as verified by Cummins (1999), due to the mounting use of herbicides owing to the herbicide-resistant traits typical to GM crops, the effectiveness of pesticides will gradually decrease. This will subsequently increase the use of even more toxic pesticides by farmers intending to rid their fields of weeds without any detrimental effect to their crops. Should these super-pesticides be used excessively without moderation, pesticide residues in soil and on crops will inexorably increase, rendering the soil infertile and even poisonous. Therefore, it can be deduced that the cultivation of GM crops is harmful to the environment.

4.0 High Costs

Introducing a GM food into the market worldwide proves to be a costly and arduous process, in which companies involved would then be inclined to ensure positive, profitable revenue for their investment towards its manufacture and marketing. To avoid copyright infringement, these companies then patent new plant engineering technologies and GM crops produced by them respectively. This would inevitably raise the costs of seeds of GM. In addition, agri-biotechnological companies might abuse the costs of these seeds to generate more profit and proceeds to the dejection of farmers.

4. 1 Excessive Cost of Seeds

Due to the patenting of GM crops and new crop engineering technologies, the price of seeds of GM crops has soared to astonishing heights as the prices are dictated by their respective agri-biotech companies. Certain breeds of GM crops and their seeds can only be created by certain companies, and these companies will then have full monopoly over its pricing. As such, prices of such GM seeds are not regulated and can even be as much as £10 for 100 grams as compared to £10 for 100 kilograms for its conventional counterpart (Malone, 2008). Small-scale farmers and Third World countries are unable to afford the cost of these GM seeds, but remain dependent upon them due to dire circumstances or termed conditions. This inevitably widens the gap between the privileged and the marginalised.

As elucidated by Andrews (2009), GM seeds have skyrocketed and increased sharply throughout subsequent years. Farmers and Third World countries purchasing Monsanto's Roundup Ready 2 Soybeans, a GM crop engineered by a leading agri-biotechnological company specialised in the manufacture of GM crops, in 2010 are required to pay an additional 42% more than the price they disbursed for in 2009. However, these countries and farmers are tied down by a contract in which they are required to patron Monsanto for specified number of years, rendering themselves incapable of any other option other than being indebted to the company. This is merely one of the examples in which the elevated prices of GM seeds prove to be detrimental to farmers and Third World Countries.

4. 2 Abuse of Cost by Agri-biotechnological Companies

Agri-biotechnological conglomerates might also exploit the cost to produce GM seeds. In an effort to enhance sales and profits, agrochemical industries have developed a technique referred to as the terminator technology to prevent farmers cultivating particular GM crop to save and re-plant harvested seeds. The terminator technology designates crops that have been genetically manipulated to yield sterile seeds upon harvest. This will result in farmers and Third World countries being compelled to procure seeds from those companies - often at an inflated price.

To further fortify this argument, it has been reported that Monsanto has incorporated Delta & Pine Land, the world's prime cotton seed company possessing three US patents on terminator technology, into its midst. These sterile genetically altered seeds would be able to secure a much greater monopoly than patents by making it unfeasible for farmers to re-use harvested seeds from their GM crops. This compels force dependence upon external sources for seeds by small farmers as well as Third World countries that are financially challenged. Hence, agri-biotech companies stand a chance to garner huge profits from the fragile fiscal instability such parties endeavour from.

Beneficial to Farmers

Advocates of GM crops persistently insist that even with the high costs required for growing GM crops, farmers remain as the ones reaping the benefits eventually. They are assured that GM crops are able to incur massive yields and produce, despite their initial costs for seeds. The profit gained at the end of the day would be more than sufficient to reimburse the

cost of GM seeds at the start. On the contrary, this allegation is falsely based. GM crops have proven time and time again to be damaging to farmers. As is the case in India, thousands and thousands of Indian farmers are resorting to suicide after planting GM crops (Malone, 2008). They were promised with harvests previously unheard of and riches as well as incomes undreamt of by cultivating GM crops. Enticed by the assurance of future prosperity, these farmers then borrowed money in order to purchase the seeds needed. However, when harvests failed attained what has been promised, these farmers are left with escalating debts, and no incomes. Consequently, to escape from reality and anguish, they remedied their predicament through suicide. Hence, it can explicated again that GM crops are in fact, disadvantages to man.

5. 0 Recommendations

To address this issue, first of all, governments worldwide should play their respective parts. To curb and stem the growing ascendancy of GM crops and the marketing of GM foods, governments of countries should place a nationwide ban on GM food and crops. Agri-biotech companies should be imposed upon to discontinue manufacture and further development of GM food immediately.

However, should this option be impractical, mandatory health testing of GM food must be employed. Before being released to the public as food products, GM food must be made to undergo multiple examinations to determine its various side-effects, if any, and to ascertain its safety for human consumption.

Furthermore, compulsory food labelling of GM food must be necessitated. Agri-business industries should be made to mark their products of GM food in order for consumers to identify genetically modified foodstuff from unmodified ones.

Additionally, the usage of chemical and toxic substances such as pesticides and herbicides that may result in harm to the environment should be regulated by the government. Stringent perimeters should be implied upon the amount of these pesticides used that may be employed throughout the growth and production of these GM foods.

6. 0 Conclusion

Succinctly, GM food should be forbidden for the greater good of mankind due to human health hazards, environmental risks, as well as exceedingly high costs for cultivation. GM food has not been proven to be entirely safe for consumption, as proven by multiple cases of dangers wrought through its intake as well as utilization. Therefore, in an attempt to restrain the increasing popularity of GM food, various parties must play their respective parts and take a stand in this issue. We, as humans capable of thought and logic, must progress with caution and prudence lest we bring destruction to ourselves and to the environment. Only by doing so can the future of mankind be guaranteed and the lives of our future generations spared from unnecessary dilemmas.

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8. 0 Appendix

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