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Genetically Modified Foods: Serenity & Concerns

Rituparna Parida*, Rijhum Mahapatra and Debanjana Saha

Dept. of Biotechnology Engineering, Centurion University of Technology & Management, Ramchandrapur, Jatni, Bhubaneswar, Odisha (752 050), India

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Corresponding Author

Rituparna Parida

e-mail: smrutiparida0@gmail.com

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Abstract

The involvement of genetically modified food stuffs among the non-genetically modified food items have put people feel uneasy about this. The controversy of genetic engineering is for crops. Humans worry about the expansion of the engineering genes into the habitat because they think that as the new gene is inserted into it, may cause some allergy. Whereas genetically modified foods have the possibilities to solve numerous of the problems. Particular gene is shifted in the plants to increase their agronomy. GM crops are resistance to abiotic stresses like herbicides, also they are engineered to give rise to resistant to insects, viruses *etc*. Genetically modified plants were put to the test to be eaten in multiple organizations and after so many studies the science got involved. So, here I am informing that consuming genetically engineered crops or foods is no more risky. It is as friendly as the non-genetically engineered foods.

Introduction

From beginning the Agriculture is being tolerating from pest and disease contagion, causing unforeseeable rupture in food production. From last 100 years the evolution of the modern biotechnology has increased in size of the biological new tools for crop productivity. Genetic modifying of plants for resistance to blights and infections, by designing transgenic pest protected crops, is a main tool for developing food safety. Increasingly the genetic modified crops have become important since they have targeted for the betterment of the agricultural productivity. The designed gene is inserted into the genome of the plant by the help of a vector. The genetically modified crops are sown every year proceeds to grow, and excitingly the adoption of its seed is the most fastest adopted farming technologies in the history. As believed to ISAAA, the most important engineered crops planted worldwide in 2018 are soyabean, cotton, corn, canola. The area of the GM soyabean production in the field, globally is by 78% in 2018. The GM cotton production in the field worldwide is by 76%. It got decreased by 32.9 million hectares and cotton increased by 30% to a total of 197.2 million hectares. However, technologies face this type of adverse effects.

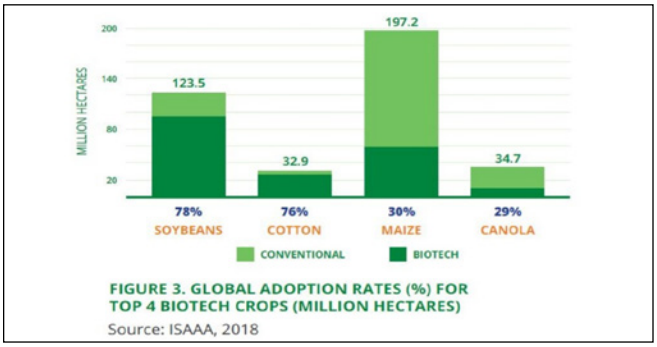

Figure 1: Global adoption rates (%) for top 4 biotech crops (million hectares)

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E-mail: *bioticapublications@gmail.com*

Table 1: Global Area of Biotech crops, 1996 to 2018

Year	Hectares (Millions)	Acres (Millions)
1996	1.7	4.3
1997	11.0	27.5
1998	27.8	69.5
1999	39.9	98.6
2000	44.2	109.2
2001	52.6	130.0
2002	58.7	145.0
2003	67.7	167.2
2004	81.0	200.0
2005	90.0	222.0
2006	102.0	250.0
2007	114.3	282.0
2008	125.0	308.8
2009	134.0	335.0
2010	148.0	365.0
2011	160.0	395.0
2012	170.3	420.8
2013	175.2	433.2
2014	181.5	448.0
2015	179.7	444.0
2016	185.1	457.4
2017	189.8	469.0
2018	191.7	473.7
Total	2339.5	5780

Welfare Evaluation of Genetically Modified Food

WHO suggests that each food item and its security should be evaluated and it is not right to give direct statements on the genetically modified foods safety. The comparison between the genetically engineered food and its ceremonial counterpart results the welfare evaluation of a genetically engineered food.

Welfare evaluation includes:

- Individuality
- Source
- Arrangement
- Effects of cooking
- The recombinant DNA
- Potential allergenicity

Enactment of Transgenic Plants

- The desired characteristic is identified of an organism and the gene which is responsible for this characteristic is situated and the whole DNA is cut off.
- Then the gene is attached to carrier and got inserted into the cells to be engineered plant. Mainly plasmids behave like a carrier.
- A promoter is also introduced so that gene functions properly when introduced into plant.
- All together is then inserted into a Bacteria and it is ready to reproduce lots of copies of genes that are then transferred into the plant to be engineered.
- The genetically modified plants are mated with conventional plants of the same species for future use.

Advantages of GM Foods

1. Alteration of the Chemical Arrangement in the Foods

Some Genetic alteration is specifically aimed to enhance definite nutrients that have high curative or medicinal values that include vitamin A, C, E, unsaturated fatty acids and probiotics, *e.g.*, "Golden rice". It improves malnutrition in a productive way. Likewise, by the help of this biotechnology, researchers could also transform the amino acid arrangement of proteins and of the carbohydrates. Embellishing nutritional value in transgenic products have acquired by using their carbohydrates composition. Let us take an example of "Amflora". The Polysaccharides in the potato bulb is generated by two types of starch: Amylose and Amylopectin. Amylose is starch that is only used as food starch where as Amylopectin is used in the yield of non-food starch and in textile processing. The synthesis of starch needs lots of enzymes that contain a GSBB. In GSBB's absence Amylopectin is formed exclusively. By the help of this method led to process to alter the arrangement of potato starch. The transgenic method includes the insertion of extra copy of GSBB–coding gene into the potato bulbs.

2. Development in Food Processing

To ease the food processing, the GM process can also be occupied. A great attainment is "Flavrsavr". The genetic modification includes the insertion of an anti sense gene that conceals the enzyme known as polygalacturonase. This enzyme is responsible for the slowing down of tomatoes ripening and that increases the life span of the fruits.

There are no limitations of genetic modification for plants. But it is applicable on the products of animals.

3. Products for Therapeutic Purposes

The techniques of genetic modification only allow the viral or bacterial antigens in the eatable parts of the plant cells. The genetically modified foods can be taken as oral vaccinum, immune system can be stimulated, so that to produce the antibodies. Some crops are not studied yet as the

eatable vaccines, *e.g.*, *Zea mays*, *Oryza sativa* and *Glycine max*.

Environmental Risks of Genetically Modified Foods

1. Choosing the Right Resistance

Most of the genetically modified foods are aiming towards the altered plants they are pest resistance or herbicide resistance. The insect resistance crops are specially designed by the biotechnology engineers to express the insecticidal crystal proteins (CRY) that is produced by *Bacillus thuringiensis* (Bt) bacterium itself.

The Herbicide resistant crops are designed to express the enzymes that help against the herbicides. Like, the herbicide which is applied by humans kills the weeds but it does no harm to the crops. By using these two technologies immediately reduces the incurred costs by the farmers.

2. Break of the Food Chain

There is another possibility of the insect resistant crops may increase in the number of the pests that are minor while decreasing the pest that are the major type. Here the situation is that the pest community may shift from those postponements by the modified crops to other, dauntless species. In turn, thus thing may loose an universal disruption of the complete food web, with fresh predators of the new insects species.

May be this break works in the other direction, where the insect resistant plants may produce the negativity in organisms found in the soil.

3. Resistance to Antibiotics

Expansion of resistance to antibiotics is well known to the science of medical and is attributable to the extra–use of the therapeutic antibiotics that are in medicines and in the husbandry.

Conclusion

The world eats 1100 billion pounds food everyday and Astronomers suggests that we will need 70% more by 2050. So, to preserve and protect the surroundings or environment we have to improve the yield and reduce the reliance beyond chemical pesticides. All we have to find a way with the land we have got now with more methods like GM crops. Intensifying it instead of expanding it means GMO can become the new organic. While the ecological, health and commercial risks of GM plants shall be properly calculated before full scale adoption the GM plants those are available have proved that they are beneficial to husbandry and to the environment. GMO have potential to not only drastically change agriculture but also it definitely affect survival irresponsible behaviour. GMOs could be our most powerful weapon to save our Biosphere.

Reference

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