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A Review On Genetical Modified Food

Anjana Male*[1], A. Vinay Mohan[1] and T. Theresa Manaswi[1]

[1]Nirmala College of Pharmacy, Atmakuru (V), Mangalgiri, Guntur District, Andhra Pradesh-522503.

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Corresponding Author Email: anjana.male@gmail.com

Abstract: Genetic engineering is modifying the genome of the plants and animals to make them more resistant to the draught or pests. Future aspects of GMF Increasing Food Production, herbicide tolerance, improved in quality, improved production. **Methodology:** The GMF Methods are crossbreeding, mutagenesis, protoplast fusion, polyploidy, genome editing, transgenesis and also include DNAextraction, genecloning, transformation, selection of breed. **Conclusion:** One need to think of fossil fuelled industrial revolution versus global warning. Certainly many of the risks of genetically modified crops are speculative but they are scientifically plausible and offered in good faith.

Keywords
Genetically modified food, Gene insertion.

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INTRODUCTION:

Despite of the green revolution introduced in globally in the 1970' s, the exponential growth of human population creates significant challenges for the future. Nearly 870 million people suffer today of malnutrition, most of them being localised in the countries from Africa, Asia &South America [(1)]. Genetic engineering now a day's modifying the genome of the plants and animals to make them more resistant to the draught or pests or enrich production of specific nutrients, enzymes or vitamins. However genetically modified foods are also perceived as major threats for biodiversity, environment and human health, being often ladled with the negative metaphor of "Franken foods" [(2)] The wide spread use of genetic engineering in food production reflects the strength of agriculture and food industries, especially in developed countries.28 countries cultivate transgenic plants in an area of 181.5 million hectares and an increase of over 100 times since 1996 [(3)].

Definition:

Genetic modification or genetically modified foods (GMF'S) involves altering the genes of an organism, be it a plant, animal & microorganism. This can be done by altering an existing section of Deoxy ribonucleic acid (DNA) or inserting a gene from another organism. Genes carry the instructions for how we appear and what characteristics we have which are inherited by an organism [(4)]

Methodology [(5)]:

Cross breeding [(5A)]: This technique has been used since the 1700s, it's when you take two sexually computable crops and cross pollinate them to produce a hybrid. Examples are plumcot (plum and apricot), limequat (lime and kumquat).

Mutagenesis: Mutations are genetic changes that can switch add or delete nucleotides those are A, T, C&G these genetic changes can lead to new /enhanced traits which is plant breeders sometimes induce the genetic changes using radiation or

chemicals. Example radiation was used to produce a deeper colour in the grape fruit.

Protoplast fusion: It's actually when you take two plants cells which have their hard cell walls removed (protoplasts) and you add a chemical called polyethylene which allow the two cell to stick together. once they are stuck together basic chemicals are added to help the two cells combine and exchange genetic information to create a hybridized plant cell. it's much like cross breeding, except it's done in a lab.

Polyploidy: Diploid animals (humans) which mean we have two sets of homologous chromosomes. polyploidy have more than one and the induction of polyploidy is used by plant breeders to control reproduction.

Genome editing: This process has been ability to cut, replace or insert genes within the seed cells using molecular scissors called nucleases these nucleases are artificially engineered to accurately place in desired genes, ortraits, into the genome of the crop. Herbicide tolerant canola was created using this technique to help famers control weeds.

Transgenes: When genes from one crop are incorporated into another crop since the genetic code is readable by all living organisms, this means that are the genes introduced will code for the same proteins as it did before.

The past, present & future of GMF's:

The Past: Selective breeding was extensively used since ancient times to improve plants and animals resulting in the present day species of crop of fruits, vegetables and livestock. Some times to accelerate and diversify mutations that might be useful for agriculture, plant seed, are even exposure to doses of radiation. Unfortunately, traditional breeding can be very time consuming and often not very accurate regarding the resulting traits [6].

The Present: Despite the ongoing controversies regarding the safety of genetically modified foods, the agro biotech research continues. The second generation of GMF's which is about to be released in 2014-2015 includes several revolutionary products, which can change for better or worse the public perception regarding genetic engineering [7]

Another GMF the transgenic salmon, developed by aqua botany may be also launched in 2014, representing an historical milestone as the first genetically modified animal destined for human consumption. [8]

The Future: To describe the possible alternatives of GMF's

A. We analysed the existing research which developed possible scenarios

B. Developed three alternatives future scenarios that have then submitted for analysis and validation to French and U.K. experts and consumers. On the other hand, we attempt to explain the factors determining the evolution of GMF's using 2 important theoretical perspectives, since the society represents the general framework in which these changes take place. [9, 10]

Purpose of GM Food's :[11]

Increasing Food Production: Genetically modified Crops currently boon the market has been designed to enhance crop production by bolstering the plant's resistance against disease, by protecting them against insect damage, or by introducing herbicide tolerance in order to control weeds more effectively.

Herbicide Tolerance: Many of the first generation herbicidal agents were non selective and environmentally damaging.

Insecticidal activity and disease resistance: The most widely exploited transgene conferring insecticidal activity is BT, isolated from the bacterium Bacillus Thuringinesis.

A biotic stress tolerance: A biotic stress particularly soil salinity, drought and extreme temperature is a leading cause of crop loss.

Improvement in product quality: Product quality is taken to include nutritional value, organoleptic quality the prevention of or at least in the postharvest degradation or even loss of nutrients and the removal of compounds having a deleterious effect.

Improved shelf life: The Flair Sort tomato was the first GM crop and whole food approved by the US government Food and Drug Administration[11].

Improved nutritional content: The regular inclusions of fresh vegetables and fruit in the diet avoids micronutrient deficiency, that is more difficult in situations where the diet relies over heavily on cereals that lack key vitamins, minerals and essential amino acids[11].

Countries Growing GMF's :[12]

Generations in GMF's:

1st Generation

The first generation of genetically modified crops has potential to increase farmer's net returns through saving in production cost, reduction in chemical cost, increased flexibility in plants planted and in some cases yields advantages.

2nd Generation

In second generation genetic modification focuses on output traits such as improved nutritional features and processing characteristics. Development of genetically modified organisms is an advance over conventional breeding techniques. [13]

3rd Generation

Third generation of genetically modified crops are a new frontier that include genetically engineered plants and animals that produce vaccines or medications. [14]

Common GM Products: [15]

The term genetically modified organism (GMO) may be applied to cover all life forms, but it commonly used for genetically modified plants and animals

Genetically Modified Crops: The main goals of research and development in genetic modification of plants have been developing crops with both enhanced agronomic input traits that yield quality products and output traits such as improved nutritional value.

Genetically Modified Animals: Different kinds of applications for genetic modification in animals include enhanced animal growth and reproduction capacity; production of novel products, especially therapeutic proteins for human health care; and improved animal health.

Genetically Modified Micro-organisms: Several microbial recipients of transgenes as biological control agents known as bio pesticides and bio fertilizers are safe alternatives to chemical pesticides and fertilizers respectively. Other work aim in improving process control, yield, efficacy and quality through genetic modifications of micro-organism's [15]

Benefits of GM Foods:

Agronomic Benefits: 1996-2012 saw an increase of more than 370 million tons of food crops. One seventh of the increased yields are attributed to GM crops in the U.S. To achieve an equal increase in yield as delivered by GM crops, it is estimated that an addition of more than 300 million acres of conventional crops would have been needed. [16, 17]

Economic Benefits: From 2006 – 2012, the global increase in farm income from GM food had reached 116 billion, almost triple that of previous 10 years. [16, 17]

Modifications of the chemical composition in food: Some genetic modifications are specifically targeted to enrich certain nutrients or substance having high therapeutic and prohealth values, including vitamins A, C, E unsaturated fatty acids, alimentary cellulose and probiotics. [18]

Improved in food processing: The GM technology can also be employed to facilitate food processing. A notable achievement is "Flavr Savr" tomatoes. They are produced by the California Company, calgene in 1992. [19]

Products for therapeutic purpose: Genetic engineering techniques enable the expression of viral or bacterial antigens in the edible portion of the plant. Transgenic foods can serve as oral vaccines, capable of stimulating the immune system, via mucosal immunity it produces antibodies. [20]

Risks of GM Foods:

Human health: consumption of genetically modified foods are safe or not is the leading subject for public controversies. Consumers desire to know about the transient and long term, allergenicity, toxicity and spread of transgene are commonly concerned. It has been demonstrated that DNA fragments from high copy number genes can pass across through the GIT and go to the internal organs and blood of different animals [21] There are also animal studies reporting that consumption of GM foods may lead to disruption to kidneys and liver, higher rates of infant mortality and infertility problems but more tests are needed for verification. [22, 23]

Wild life and environment: Impacts and risks of GM organisms to the environment may be more apparent to human health. Some common environmental concerns include a reduction of biodiversity, contamination of wild species, threats to non-target species, outbreak of antibiotics resistant bacterial strains and super weeds and deterioration of soil and water pollution. It is concerned that the GM technology promotes large scale monoculture and may reduce the biodiversity. [24]

CONCLUSION:

The whole history of human technological development pitting the clear advantage intended consequences against the mucky possibilities of unintended consequence. One need to think of fossil fuelled industrial revolution versus global warning. Certainly many of the risks of genetically modified crops are speculative but they are scientifically plausible and offered in good faith. Ignoring them in euphoria of immediate advantage is equally unscientific. Drawing the past experience, it seems unlikely the technological momentum towards genetically modified foods can be stopped dead in its tracks. The immediate advantages are too tangible to ignore or set aside out of fear of the unknown and unintended disadvantages [25].

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