

GM Crops: A War That You May Not Be Aware Of

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SUMMARY

Genetically modified crops are making their way into our lives, the reason being unavailability of food, large population to feed and constraints in crop production to meet the requirements of all. The Genetically modified crops may look like a boon initially but only on the surface. There are many risks underlying the glory of GMOs that we are still debating over. The risks of food allergy and synthesis of toxic compounds are two important factors which are considered when talking about releasing the GM products in the general market. The dangers of change in gene pool should also be well thought out upon.

INTRODUCTION

The idea of producing with the desirable qualities paved the way for the development of genetically modified food worldwide. Scientists were able to isolate genes with favourable traits and inserted them in crops to produce food that can resist drought, insects, pesticides and is even more nutritious. It started by developing a tomato with a longer shelf life in 1994 called Flavr Savr. But then, it was found that consumption of engineered tomato caused stomach lesions in rats, thus raising issues about the safety of genetically modified food in general. Since then, debate on the demerits of consumption of genetically modified food has increased. The number of countries growing genetically modified crops has increased in recent years compromising the safety of these products. Supporters claim that it will feed the world and promote better health and ecological welfare, while others believe the food contains risks to human health. Genetically modified organism includes crops, vegetables and fruits that have been created using genetic engineering methods. Scientists combined desired genes from various species to create new genetically-altered crosses with enhance nutritional, productive and ecological value. This differs from traditional breeding as genetic transference between unrelated species does not occur biologically in nature. The process of combining inter-species genes which is called recombinant DNA technology does not have the checks and balances that are imposed in traditional breeding which increases the risk of genetic instability. This means that no one can make any accurate predictions about the long term effect of GMOs on the human being and the environment. Extensive testing in this regard is either very expensive or impractical and there is still a great deal about the process that the scientists do not understand. This is the crux of the matter in the outgoing debate of GMO's. Food is an emotional topic. Its matters a great deal to us. We are what we eat after all. The subject is also of vested interest for the corporation that manufactures genetically modified seeds and agricultural technologies. The anxiety of consumers is induced by the effects of genetic modifications, including effects of molecular biology techniques which, in interfering with the process of natural recombination, disturb the ability for normal propagation. The problem of taking advantage of transgenic food reflects misgivings of both biological natures related to the complexity of the involved processes and ethical principles linked to problems of the existence of living organisms (Domingo, 2007).

Risk of food allergy:

The transfer of genes from the cells of one organism to another organism results in the expression and synthesis of new proteins, absent till then in parental cells. The new amino acid sequence forming structure of a given protein poses the main risk of food allergy development due to exposure to transgenic food. Proteins obtained due to genetic modifications are thought to carry an allergizing potential if its sequence is homologous to another, defined allergen, inducing unfavourable immune body reactions. It is estimated that food components allergize approximately 2% of the world's adults and as many as 6% of children (Bernstein et al., 2003). The unfavourable effect of Genetically Modified Organisms is seen in the popular case of Aventis with a utility name StarLink, the producer of maize in America. The modified maize had an additional gene which provided natural

resistance to the pesticides. Soon after commercialization of the transgenic plant, StarLink maize was detected in food products generally accessible on consumer markets (e.g., in tacos). Spread of the information through mass media was followed by numerous reports by consumers related to symptoms of food allergy in the form of headaches, diarrhoeas, nausea and vomiting, which were supposed to develop following consumption of products containing the genetically modified maize (Domingo, 2007).

Synthesis of toxic compounds.

This can be exemplified by events which took place in Spain in 1983, when a modified rape oil with a pronounced toxic effect was permitted to enter the general market. It was speculated that the intoxication induced the so-called toxic oil syndrome (TOS), reflecting contamination of the oil with aniline or its derivatives, responsible for the toxic signs (Kramkowska *et al.*, 2013). The relationships of transgenic food effects on human body are being investigated by conducting numerous tests on animals. Thus, a few independently working groups of researchers have presented data on the potentially harmful influences of MON810 maize (resistant to corn borer) on cells of the pancreas, intestines, liver and kidneys in rodents. Results of other studies testing the effects of different varieties of transgenic maize (MON810 and MON863) on living bodies – the maize producing Bt toxin making it resistant to insects, and NK603, maize, resistant to the Roundup herbicide – pointed to the potential for induction of histopathological lesions first of all in liver and kidneys and, thus, in the principal detoxifying organs. This was confirmed by experiments on rats fed for 90 days with 11% or 33%, respectively, of components of transgenic maize, and compared to a control group of rats fed the unmodified analogue. Moreover, the chronic toxic effects should be evaluated after long-term monitoring – for a period of about two years – while the quoted studies lasted for only three months (Vendômois *et al.*, 2009).

Variability and unexpected results.

Transgenic organisms, such as genetically engineered crops, released into the environment will potentially interact with a diversity of habitats in time and in space, and the potential risks from a single type of transgenic organism may vary accordingly. For example, among cultivated and natural populations, gene flow can occur regularly or not at all, and substantial variation in risks from gene flow may arise from variation among cultivars, from factors such as distance from the source population, or from the size and density of the source population relative to recipient populations (Prakash, D. *et al.*, 2011).

CONCLUSION

Consuming the highest quality of nutrients is the best option for a healthy life style than can even reverse the adverse effect already implemented by GM food. This may come from organic food as well as supreme supplement that provides quality nutrients and antioxidants in a convenient way for us to grab. GMO'S are not the answer to the world hunger and health. Instead, we should focus on improving organic agricultural practices which are kinder to the earth and healthier for humans.

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