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Sub : Biology.

Topic : "Genitically modified food"

Compile points on technology involved , advantages & disadvantages....

A genetically modified food is a food product developed from a different genetically modified organism (GMO) such as a crop plant, animal or microorganisms, such as yeast. Genetically modified foods produced by genetic engineering have been available since the 1990s. The principal ingredients of GM foods derived from plants are soybean, maize, canola, cocoa beans, and cottonseed oil.

Advantages of (GM)

- Disease resistance There are many viruses, fungi and bacteria that cause plant diseases. Plant biologists are working to create plants with genetically-engineered resistance to these diseases.

- Pest resistance : Crop losses from insect pests can be staggering, resulting in devastating financial loss for farmers and starvation in developing countries. Farmers typically use many tons of chemical pesticides annually. Consumers do not wish to eat food that has been treated with pesticides because of potential health hazards, and run-off of

agricultural wastes from excessive use of pesticides and fertilizers can poison the water supply and cause harm to the environment. Growing GM foods such as B.t. corn can help eliminate the application of chemical pesticides and reduce the cost of bringing a crop to market.

- Drought tolerance/salinity tolerance : As the world population grows and more land is utilized for housing instead of food production, farmers will need to grow crops in locations previously unsuited for plant cultivation. Creating plants that can withstand long periods of drought or high salt content in soil and groundwater will help people to grow crops in formerly inhospitable places.

- Pharmaceuticals Medicines and vaccines often are costly to produce and sometimes require special storage conditions not readily available in third world countries. Researchers are working to develop edible vaccines in tomatoes and potatoes16, 17. These vaccines will be much easier to ship, store and administer than traditional injectable vaccines.

- Herbicide tolerance : For some crops, it is not cost-effective to remove weeds by physical means such as tilling, so farmers will often spray large quantities of different herbicides (weed-killer) to destroy weeds, a time-consuming and expensive process, that requires care so that the herbicide doesn't harm the crop plant or the environment. Crop plants genetically-engineered to be resistant to one very powerful herbicide could help prevent environmental damage by reducing the amount of herbicides needed.

- Nutrition Malnutrition is common in third world countries where impoverished peoples rely on a single crop such as rice for the main staple of their diet. However, rice does not contain adequate amounts of all necessary nutrients to prevent malnutrition. If rice could be genetically engineered to contain additional vitamins and minerals, nutrient deficiencies could be alleviated.

Disadvantage of (GM)

✖ Reduced effectiveness of pesticides : Just as some populations of mosquitoes developed resistance to the now-banned pesticide DDT, many people are concerned that insects will become resistant to B.t. or other crops that have been genetically-modified to produce their own pesticides.

✖ Gene transfer to non-target species : Another concern is that crop plants engineered for herbicide tolerance and weeds will cross-breed, resulting in the transfer of the herbicide resistance genes from the crops into the weeds. These "superweeds" would then be herbicide tolerant as well. Other introduced genes may cross over into non-modified crops planted next to GM crops.

Human health hazards :

- Allergenicity : Genetically modified foods have developed life-threatening allergenicity among people. There is a possibility

that introducing a gene into a plant may create a new allergen or cause an allergic reaction in susceptible individuals.

- Unknown effects on human health : (GM) food are not only useful but harmful too. They cause various disorders in organisms. For eg : A recent article published in Lancet examined the effects of GM potatoes on the digestive tract in rats. This study claimed that there were appreciable differences in the intestines of rats fed GM potatoes and rats fed unmodified potatoes. Yet critics say that this paper, like the monarch butterfly data, is flawed and does not hold up to scientific scrutiny34. Moreover, the gene introduced into the potatoes was a snowdrop flower lectin, a substance known to be toxic to mammals.