

## SEMINARS

Three seminars and one round table discussion were organized in the year 2010 to 2011 with the participation of University faculty members, researchers and scientists from home and abroad. Summary of the different seminar papers are given below:

### SEMINAR-I

#### **GM FOODS: CONTROVERSY; PERCEIVED EFFECT ON HUMAN HEALTH, ENVIRONMENT AND BIODIVERSITY**

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#### **Summary**

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Throughout history food crops have been genetically modified from their original wild state by domestication, selection, and control breeding which takes long periods of time. Traditional breeding is limited to exchanges between the same or very closely related species. Little or no guarantee of any particular gene combination from the million of crosses generated. Undesirable genes can be transferred along with desirable genes and it takes a long time to achieve desired results.

Genetic engineering speeds up the plant breeding process in variety of ways by which desired genes can be inserted into a particular plant. A genetically modified crop plant contains a gene or genes which have been artificially inserted. GM-allows the direct transfer of one or just a few genes between either closely or distantly related organisms. Crop improvement can be achieved in a shorter time compared to conventional breeding. This technology also allows plants to be modified by removing or switching off particular undesirable genes. Widely used procedures for inserting novel genes into the DNA of plants is the use of plasmid DNA of a soil bacterium (*Agrobacterium tumefaciens*) to ferry the genes, but it is also possible to insert genes directly into a cell or a "cell without a cell wall" (protoplast), using a gene gun (Biolistic process). Most common genetic modifications in plants were developing herbicide tolerant and insect resistance plants such as Bt plants that contain toxin gene from *Bacillus thuringiensis*.

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In Southeast Asia, 70% of children under the age of five suffer from vitamin A deficiency. Vision impairment and increased disease (diarrhea) are the result of this deficiency. Recently engineered Golden Rice would produce more vitamin A precursor, beta-carotene which would alleviate the deficiency problem. There are some controversies regarding the adoption of GM crops. There is a strong public opinion about GM crops in European Union and Japan. In the US and Canada there are strong regulation and different level of regulatory bodied overseeing adoption and release of GM crops which are widely grown and introduction of GM products are less controversial.

Wide scale screening, testing, safety assessments and trial has shown that no new risks associated with GM crops. Environmental concerns regarding impact of GM crops on biodiversity, pollen contamination and soil toxicity due to use of Bt gene has either been addressed or looked into by the concerned regulatory agencies. To date no adverse health effects by products approved for sale have been documented. Most studies concluded that GM foods do not differ in nutrition or cause any toxic effects in animals. European Food Safety Authority (EFSA) reported no harmful effects of some Bt corn either on environment, or as animal feed on human or animal health. GM plants are continuously monitored once approved.

Future directions of GM crops would continue to develop crops resistance to herbicides, pests and pathogens, tolerance to drought, salt, heavy metals and low/high temperature, improved nutritional quality (proteins, oils, vitamins, and minerals). Improved shelf life of fruits and vegetables, improved flavors and fragrances, elimination of allergens, production of vaccines, human therapeutic proteins, pharmaceuticals and phytoremediation.