BT BRINJAL: BOON OR BANE

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We all know that India is the birthplace of the famous vegetable 'BRINJAL' and is called the 'king of all vegetables'. From October 2009 to February 2010 and thereafter, we have seen a lot of controversy regarding a new genetically modified agricultural food product- Brinjal, the modified version termed as the 'Bt Brinjal'. However, the journey of this new nascent plant till now is not an enjoyable ride and has been shown thumbs down in various parts of our country.

What actually are the genetically modified (GM) plants? Why are they modified? Is there any Law regarding their use and control? What is the controversy and what are the issues involved? Are some of the pints which I try to raise and provide for a neutral and equivalent answer.

Genetically Modified Food and Intellectual Property Protection:

Protection of Intellectual Property has been introduced in Developed countries' agriculture, in the course of the 20th century. The progressive commercialization of agriculture in developed countries has been linked to the decreasing importance of agriculture as an economic activity and as a provider of employment. In most of the developing countries, while the importance of agriculture in overall production has decreased, its contribution in terms of livelihood and employment generation remains significant. Also, where in most of such countries, malnutrition remains an inevitable issue and even food security is directly linked to agriculture, such modified version of agriculture advocates itself to be a boon for human race.[1]

Biotechnology generally refers to the manipulation of living organisms, it is infact an ancient practice, and covers all technological applications using biological systems, living organisms or their derivatives to make or modify products or processes, like fermentation, micro propagation and food processing technologies used to produce beer, wine, cheese, etc. In more specific context to agriculture it refers to different research tools that scientists understands and manipulate the genetic make-up of organisms for use in agriculture. It includes for instance, genomics and bioinformatics, marker assisted selection,

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1. Suman Gupta, 'Intellectual Property Protection for Plant Innovation:A Journey from UPOV to TRIPs', XXV DLR 122(2003).

micropropagation, tissue culture, cloning, artificial insemination and embryo transfer.[2]

Genetic engineering are the recombinant DNA techniques which is applied particularly in the agricultural crop sector. It refers to the modification of an organism's genetic make-up in which DNA from one organism or cell (the transgene) is transferred to another organism without any sexual reproduction. The main distinction between conventional breeding and genetic engineering is the latter's ability to move genes across species barriers. They are different from hybrid plants also since in it two genes are cross-pollinated without any outside gene/DNA modifications.[3]

Genetic engineering includes insect resistant traits, such as where genes that produce the insect-killing toxins in bacteria Bacillus thuringiensis (Bt) are transferred into crop plants. These crops have been promoted as a way of killing certain pests and reducing the application of conventional synthetic insecticides. It also includes herbicide tolerant traits whereby a herbicide tolerant gene is inserted into a plant that enables farmers to spray wide-spectrum herbicides on their fields killing all plants apart from transgenic ones.[4]

The development and use of genetic engineering has been promoted partly as a solution to the shortcomings of chemical inputs. GM food varieties are most controversial since it include concerns with the environmental impacts of the introduction of these varieties, the impacts o human health and the legal and policy impacts, and also because it directly touches food and livelihood rights of millions of people around the world with socio-economic impacts.

Such Intellectual Property protection has been dealt with in India by Protection of Plants Varieties and Farmers' Rights Act, 2001 which came into existence to provide for the establishment of an effective system for protection of plant varieties, the rights of the farmers' and plant breeders and to encourage the development of new varieties of plants. It had been considered necessary to recognize and protect the rights of the farmers in respect of their contribution made at anytime in conserving, improving and making available plant genetic resources for the development of the new plant varieties. Moreover to accelerate agricultural development, it was felt necessary to protect plant breeders' rights to stimulate investment for research and development (R&D) for the development of new plant varieties. Such protection is likely to facilitate the growth if the seed industry which will ensure the availability of high quality

2. Phillipe Cullet, 'Intellectual Property Protection & Sustainable Development', New Delhi, LexisNexis Butterworths, 2005.
3. Ibid.
4. www.wikipedia.com on 06/03/2010 at 1:15 p.m.

seeds and planting material to the farmers.[5]

However the use of any variety registered under the Act by any person using such variety for conducting experiment or research and the use of a variety by any person as an initial source of the variety for the purpose of creating other varieties is not prevented, but the authorization of the breeder of a registered variety is required where the repeated use of such variety as a parental lien is necessary for commercial production of such other newly developed variety.[6]

Bt Brinjal- Meaning and the Controversy:

Bt Brinjal is a transgenic brinjal created by inserting a gene (Cry 1 Ac) from the soil bacterium Bacillus thuringiensis(Bt) into brinjal. The insertion of this gene into the vegetable is said to give the brinjal plant resistance against insects like the brinjal fruit borer (Leucinodes orbonalis) and fruit borer (Helicoverpa armigera).Upon ingestion of the Bt toxin by the insect there would be disruption of its digestive processes, ultimately resulting in its death. Thus it requires less pesticide that are widely used for the hybrid crops.

The Governments' Genetic Engineering Approval Committee (GEAC) which cleared Bt Brinjal for release in October said it will reduce the farmers' dependence on pesticides and enable higher yields. This point of view has been supported by Science and Technology Minister Prithviraj Chavan, Council for Scientific and Industrial Research Director General Samir Brahmachari and Department of Biotechnology Secretary M.K.Bhan. They all said Bt Brinjal is safe for human consumption.[7]

However the final approval has to be given by Environment Ministry as its Minister Jairam Ramesh is not very sure because of various vociferous protests and is holding public meetings on the issue. The debate over the petridish baingan is hotting up. The minister's sudden recourse to public consultation after Bt Brinjal was clerad as India's first genetically modified food crop has exposed serious regulatory lapses.

The issue attracted attention as eight state governments came out against Bt Brinjal in varying forms and degrees. While some asked for a moratorium pending further testing of its bio-diversity, others rejected the very idea of letting toxic genes be inserted into food crops. The government has been embroiled locally in the controversy over GM crops, seven years after Bt

5. B.L.Wadhera, 'Law Relating to Intellectual Property' (4th ed.), New Delhi, Universal Law Publishing Co. Pvt. Ltd. 2007.
6. Ibid.
7. www.timesofindia.indiatimes.com on 08/03/2010 at 6:50 p.m.

cotton had been introduced in India by the American MNC Monsanto.

PMO declared "The Prime Minister held a consultation with his senior ministerial colleagues to discuss the role of biotechnology in food security. It was agreed that the technology is an important option for higher productivity and ensuring food security but at the sane time, we must ensure that it has no adverse effects on human and animal health and biodiversity." Even the Father of the Green Revolution M.S. Swaminathan, who introduced high-yielding wheat varieties in India to feed country's hunger has sided and is completely against Bt Brinjal.[8]

Judiciary took up the matter and a committee was formed, headed by Y.K.Sabharwal,C.J.I., so as to pass an interim injunction on GEAC but eight months later the present Balakrishnan,C.J.I., vacated the stay on the GEAC. This proved propitious to Mahyco's pending application for permission to initiate large-scale field trials of Bt Brinjal. This Bench has directed that Mahyco's bio-diversity dossier on the plant be posted on the GEAC's website but all it has is the Mahyco's own analysis and conclusion.

Bt Brinjal is fatal to a pest called fruit and shoot borer. The gene acts only in alkaline environment found in the 'gut' of the insect but as the human digestive system is acidic only in the stomach while the rest is alkaline, then what effect it may have in such a case? The study done by Mahyco on rats allegedly does not address human dangers such as cancer, infertility and kidney damage.[9]

Informed consumer choice requires that the introduction of Bt Brinjal be put off till a mechanism of mandatory labeling is put in place. But then again, how will GM food be labeled in a country where frits and vegetables are not sold only in the supermarkets? And how feasible is it to maintain the segregation from the field to the market? Worse, there is no direct and precise Law firming liability in the event of contamination of non Bt Brinjal by the GM variety!!

Main Controversial Issues:

(1) When a gene can effect the alkaline system of a living organism affecting brinjal the what effect will it have in acidic and alkaline systems of the humans?

(2) Such genetically modified plants can it not get infused with gene of human and result into a new transgenic DNA effect in humans and other living organisms?

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8. Ibid.
9. www.newstoday.com on 08/03/2010 at 7:10 p.m.

(3) Bt cotton seeds have failed to yield the results with which it was introduced so what if the Bt Brinjal is also not capable of producing the result which it aims at ?

(4) India being a good producer and exporter of natural brinjals does really need such incomplete tested modified brinjals?

(5) In the sake of controlling pesticides and insecticides can human lives be gambled with and worth risking with alien genes?

(6) Human beings have evolved and developed certain specific food habits and genetic order, and then what affect such gene modified crops will have on us?

(7) The cultivation of such Bt crops will result in no seed security and agriculture sovereignty, which will surely result in our agricultural system to be at the mercy of corporate sector!

(8) What happens if there is accidental cross-pollination between Bt and ordinary brinjal?

(9) What are the long-term effects of Bt brinjal on human health, given that long term trials have not been held as the product itself is too new?

(10) Most importantly, can such seeds be reasonably and economically be made available to our poor farmers and what if such plants are not able to give the desired promised results because of the climatic and vegetative conditions?

Thus, I conclude by pointing out that there are more issues which must be settled out first before such Genetically Modified (GM) crops are introduced in developing agricultural based nations. Our government has to be resistant enough to deal with any adverse impact on health, livelihood of common man and socio-economic impacts so as to cope up with any misfortune of our poor farmers, vegetable vendors and grocers, then only this edible crop be permitted to be introduced and cultivated in our country.