



**SOUTH ASIA**  
BIOSAFETY PROGRAM

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# NEWSLETTER

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## SABP

The South Asia Biosafety Program (SABP) is an international developmental program initiated with support from the United States Agency for International Development (USAID). The program is implemented in India and Bangladesh and aims to work with the local governments to facilitate implementation of transparent, efficient and responsive regulatory frameworks that ensure the safety of new foods and feeds, and protect the environment.

SABP is working with its in-country partners to:

- Identify and respond to technical training needs for food, feed and environmental safety assessment.
- Develop a sustainable network of trained, authoritative local experts to communicate both the benefits and the concerns associated with new agricultural biotechnologies to farmers and other stakeholder groups.
- Raise the profile of biotechnology and biosafety on the policy agenda within India and address policy issues within the overall context of economic development, international trade, environmental safety and sustainability.

## WHY BT BRINJAL?

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Bt brinjal, being possibly the first edible GM crop in India, has lately been a focus of media reports and a rather 'conditioned' reaction of the public who were able to access more terrifying stories in the popular media about this new arrival in crop science.

Surprisingly, Bt brinjal came into the lime-light with the Union Minister for Health and Family Planning, Dr. Anbumani Ramadoss, going to the media stating that genetically modified (GM) crops needed a thorough testing before release. This evoked a strong protest from technocrats, pro-GM farmers' associations and scientists alike. It even went to the extent of a farmers' association issuing such statements as, "If the Health Minister is ideologically opposed to biotechnology, he must first ban production and use of GM tissue plasminogen activator, GM insulin, etc. Let him leave matters of agriculture to agricultural scientists and farmers." Greenpeace, a known global organization against GM crops, has regularly been organizing press conferences and public awareness campaigns involving popular public figures like film stars, medical professionals popular with the public for their medical service, popular magazine writers and self-styled anti-GM activists. Greenpeace's

strategy has helped them direct popular opinion against GM crops in general and Bt brinjal in particular. It is no surprise that a naïve general public sympathised with the message of the anti-GM groups, because practically no unbiased scientific information on GM crops was made available to it. Moreover, crop biotechnologists, most of whom were public servants, preferred to be tightlipped about the GM crop controversy. This was aptly explained by the Father of the Global Green Revolution, Dr. Norman Borlaug when he said, "They have done a poor job of explaining the complexities of their science to the general public." However, no one has ever questioned why anti-GM activists prefer to air their views on GM crops through the popular media, where most of the correspondents are specialists in journalism or visual communication and are uninformed about crop biotechnology, as opposed to using refereed scientific journals of global repute to air their views on GM crops.

It should be a prime duty of the scientists who work at making Bt brinjal available for farmers to use, after the government's approval, to dispel certain myths from the public's mind. Following are a few of the issues that have been discussed.

### TOXICITY AND Bt PROTEIN DEGRADATION DURING COOKING

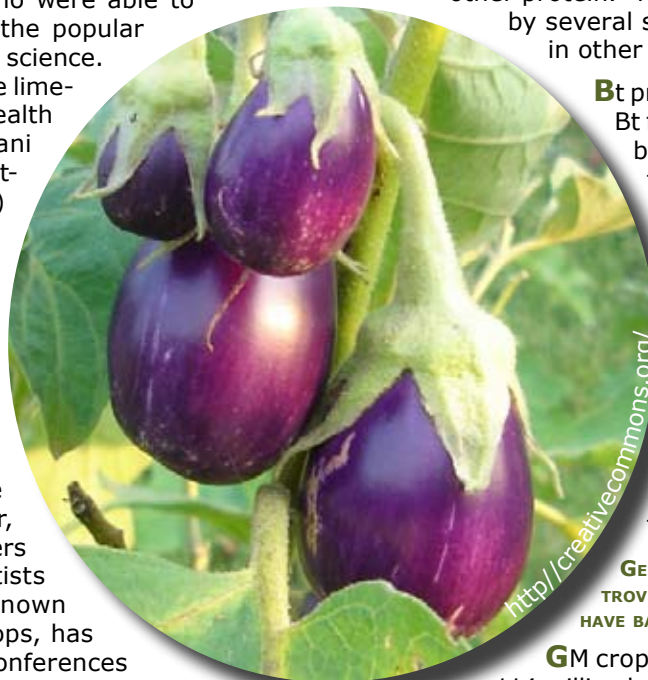
The Bt protein is not toxic to human beings or other animals. The Bt protein is toxic only to a small group of insects. The Bt protein expressed in Bt brinjal can kill only lepidopteran insects such as fruit and shoot borer. It cannot control insects belonging to other groups. The Bt protein, in order to kill the insect, has to bind to the gut cells first and such binding happens only in lepidopteran insects. In mammals or other non-target organisms, the protein does not bind to gut cells and is digested by the digestive system like any other protein. This has been proven beyond doubt by several studies, not only in brinjal but also in other crops such as cotton and corn.

Bt protein has a long history of safe use. Bt formulations, as biopesticides, have been used to control insects over five decades. So far no toxicity has been reported from food crops sprayed with a Bt formulation. Moreover, the Bt protein is not biologically active after cooking. Brinjal is usually cooked at very high temperature and during this process the Bt protein contained in the fruit is completely denatured. Based on these facts, the Bt protein expressed in brinjal fruits is highly unlikely to be toxic to human beings.

**GENETIC MODIFICATION IN FOOD CROPS IS CONTROVERSIAL AND SEVERAL EUROPEAN COUNTRIES HAVE BANNED THEM**

GM crops were cultivated in an area of over 114 million hectares in about 23 countries during 2007 (ISAAA, 2007). The GM food crops soybean and corn alone are cultivated on an area of about 95 million

(continued on page 2 - see Bt Brinjal)



## CALENDAR OF EVENTS

Event	Organization	Date	Place
<b>INDIA</b>			
Workshops on 'Management and Monitoring of Field Trials of Genetically Modified Crops'.	Department of Biotechnology (DBT), Ministry of Environment & Forests (MoEF) and Biotech Consortium India Limited (BCIL)	- Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Himachal Pradesh ( <b>March 9, 2009</b> ) - Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu ( <b>March 24, 2009</b> )	
ICAR's Winter School on Bioinformatics for Agricultural Sciences.	Bioinformatics Section of College of Basic Sciences & Humanities, Academy of Agricultural Research and Education Management (AAREM) and CCS Haryana Agricultural University, Hisar, Haryana	February 19 - March 11, 2009	CCS Haryana Agricultural University, Hisar, Haryana
A practical training course on "Genomics, Transformation and Molecular Marker Tools for Crop Improvement".	Department of Biotechnology & Molecular Biology, CCS Haryana Agricultural University, Hisar, Haryana	February 25 - March 17, 2009	CCS Haryana Agricultural University, Hisar, Haryana
<b>BANGLADESH</b>			
International Conference on Quality Seed and Food Security.	Agroforestry Society of Bangladesh, Fruit Science Society of Bangladesh, Seed Science Society of Bangladesh	February 17 - 19, 2009	Bangladesh Agricultural University, Mymensingh
International Conference on Plant Breeding and Seed for Food Security (ICPBSFS) 2009.	Genetics and Plant Breeding Society of Bangladesh For more information please contact: Prof. Dr. Md. Shahidur Email: srbhuiyansau@yahoo.com	March 10 - 12, 2009	China Bangladesh Friendship Conference Centre, Agargaon, Dhaka
<b>INTERNATIONAL</b>			
Theoretical and practical course "Developments in Biosciences for Enhanced Food and Environmental Biosafety".	Department of Molecular Biology and Biotechnology, Faculty of Science, University of Dar es Salaam, Dar es Salaam, Tanzania	August 18 to 30, 2009	Department of Molecular Biology and Biotechnology, Faculty of Science, University of Dar es Salaam
Biosafety workshop on "Theoretical Approaches and Their Practical Application in the Risk Assessment for the Deliberate Release of Genetically Modified Plants".	Wendy Craig (Biosafety Unit, ICGEB, Trieste, Italy)	October 12 - 16, 2009	ICGEB Conference and Meetings, Padriciano 99, I-34012 Trieste, Italy

**Bt Brinjal - continued from page 1**

hectares. These statistics show that GM food crops are widely popular around the world. GM crops are cultivated in some European countries such as Spain, Germany, Portugal, Poland, Czech Republic, Slovakia and Romania. Non-adoption of this technology in many European countries is due to political and market reasons and not based on scientific facts.

**DAMAGE TO THE FOOD CHAIN (NON-AVAILABILITY OF INSECTS TO BIRDS THAT PREY ON THEM)**

Cultivation of Bt brinjal does not pose any threat to the food chain. The insect killed by the Bt protein expressed in brinjal is fruit and shoot borer. This insect is not a food source for birds, hence reducing numbers of these pests is not going to affect the food chain. However, indiscriminate spraying of chemicals to control all insects in the eco-system is much more likely to cause damage to the food chain as well as potentially damaging the environment.

**DAMAGE TO THE ENVIRONMENT**

The Bt brinjal technology is an eco-friendly technology because this crop does not require chemicals to control the

major insect pest, fruit and shoot borer. It may require one or two pesticide applications to control other insects such as sucking pests. However, in contrast, a conventional brinjal crop requires many chemical sprays to control fruit and shoot borer. Indiscriminate spraying by farmers to control the fruit and shoot borer pollutes the environment while cultivation of GM brinjal is much safer for the environment.

**GM CROP CULTIVATION IS NOT PROFITABLE**

Cultivation of GM crops drastically reduces the cost of pest control, which is one of the major components of the cost of cultivation. In addition to this saving, the marketable yield is also significantly higher in the case of Bt brinjal, which in turn increases income. Hence, cultivation of GM brinjal will be more profitable not less so for the farmer.

It would be apt to conclude this essay with an excerpt from a blog on the Internet -- (Bob, December 6, 2007 06:27 PM) Total people killed by GMO crops = 0; total people injured by GMO crops = 0; now compare that to the number of people who die each year from starvation.



# CREAM OF THE (WEB) CROP

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THIS MONTH'S PICK:

## FAO Biotechnology in Food and Agriculture website

<http://www.fao.org/biotech/>

The Food and Agriculture Organization of the United Nations (FAO) "Biotechnology in Food and Agriculture" website is subdivided into 12 areas.

**News:** An archive of news items from the FAO-BiotechNewsletter and an overview of recent FAO activities.

**FAO Statement on Biotechnology:** A definition of biotechnology with a summary of its role in the world today.

**FAO Documents:** A selection of documents pertaining to biotechnology in food and agriculture that have recently been on the Web and published by FAO. Also included is a link to the FAO Corporate Document Repository, which houses FAO documents and publications and selected non-FAO publications, in electronic format.

**FAO's Activities:** A summary of the assistance FAO can provide to its member countries with specifics about the advice, technical assistance, science-based information it can offer and about its role as a meeting place for its member nations. Includes a link to the News page, which has an overview of recent FAO activities in the field of biotechnology.

**Electronic Forum:** Background information on and links to summaries of 15 moderated e-mail conferences FAO has hosted. Conference topics have included the appropriateness of agriculture biotechnologies, their impact on hunger and food security, gene flow (GMOs) and intellectual property rights.

**Sectoral Overviews:** A categorical overview of biotechnology as it applies to agro-industry, crops, fisheries, forestry and livestock.

**Events:** A calendar of forthcoming FAO-sponsored events with information about the events and links to event websites.

**Glossary:** A collection of terminology associated with the rapidly expanding fields related to or deriving from biotechnology and genetic engineering.

**Contacts:** Links to the Inter-Departmental Working Group on Biotechnology (IDWGB), which includes representatives from each FAO department focussed with aspects of biotechnology.

**Country Policy Documents:** Biotechnology policy documents from FAO members (currently 189 member nations plus the European Community). Contains some regional (within country) documents but the majority are national policy documents. Only documents available on the web are included.

**FAO-BioDeC:** A database that gathers, stores, organizes and disseminates updated baseline information on crop biotechnology products and techniques that are in use, or in the pipeline in developing countries. The database has about 2,000 entries from 70 developing countries, including countries with economies in transition.

**Links:** Provides links to a small number of selected websites that provide regularly updated information related to agricultural biotechnology. The websites include those from (1) other UN information sources; (2) non-UN inter-governmental organisations; and (3) the Consultative Group on International Agricultural Research (CGIAR) and the research centres it supports (FAO is one of the four co-sponsors of the CGIAR).

The screenshots show the following content:

- Main Page:** "BIOTECHNOLOGY in FOOD AND AGRICULTURE" with navigation links for Statement, Documents, Activities, Forum, Overview, News, Policy, Biotech, and Links.
- Search Results:** For the term "genetically modified organism", showing a definition, corresponding French and Spanish terms, and related terms.
- Data Visualization:** A bar chart showing the number of items under different phases across various countries.
 

Country	Tot under experimental phase	Tot under field trial	Tot under Commercial phase	Tot not specified
China (98)	100	100	100	100
India (210)	100	100	100	100
Indonesia (67)	52	52	52	52
Korea Rep (9)	5	5	5	5
Malaysia (44)	22	22	22	22
Myanmar (1)	1	1	1	1
Pakistan (27)	25	25	25	25
Philippines (42)	20	20	20	20
Singapore (2)	2	2	2	2
Sri Lanka (2)	2	2	2	2
Thailand (34)	25	25	25	25
Viet Nam (30)	30	30	30	30
<b>Tot</b>	<b>445</b>	<b>445</b>	<b>445</b>	<b>445</b>
- FAO-BioDeC:** A database for biotechnology in developing countries, with a search bar and filters for region and country.

## CONSUMERS IN INDIA SUPPORT FOOD BIOTECHNOLOGY AND ITS BENEFITS

Asian Food Information Centre - January 18, 2009

Consumers in Asia, particularly India, China and Philippines, are ready to accept benefits from biotechnology-derived foods, according to a consumer survey by the Asian Food Information Centre (AFIC) - a trusted, science-based resource on nutrition, health and food safety for the Asian region. The study further concludes that biotech foods may most likely become an increasing feature of the Asian diet in light of the region's growing demand for high volumes of quality food.

The AFIC survey 'Consumer Perception on Acceptance of Biotech Food in Asia' was conducted by the Nielsen Company across five Asian countries including China, India, Japan, Philippines and South Korea. The survey provides consumer insights on perceptions of biotechnology to produce foods, and assesses consumer acceptance of benefits of biotechnology-derived foods in Asia. The AFIC Consumer Perception Survey was divided into three parts: (i) consumer attitudes towards food safety and food labeling; (ii) consumer awareness and attitudes towards food biotechnology; and (iii) consumer attitudes towards 'direct consumer benefits' of food biotechnology.

Below are the Top 10 Findings on Consumer Perception on Acceptance of Biotech Food in India.

1. 95% of consumers support plant biotechnology related to sustainable food production.
2. 84% of Indians are ready to purchase biotech food such as tastier tomato, cheaper food staples, and foods/cooking oil with healthier fat profile.
3. Indian consumers are most confident with food safety levels in the country, *vis-à-vis* Asian counterparts.
4. 70% of Indians strongly believe that food biotechnology will bring benefits in the next few years.
5. 68% of consumers are satisfied with the provided information on food labels.
6. Asian consumers rated 'reducing the amount of pesticides needed to produce food' followed by 'increasing the production of food staples in the world, thereby reducing world hunger' as the most important crop growing factors related to sustainable food production.
7. While reading food labels...
  - a. Expiry date is the 'most important' information looked for by consumers.
  - b. Presence of biotech ingredients is not perceived as an additional labeling item.
8. Food biotechnology is not a priority food safety concern among consumers. The important concerns are pesticide residues, food poisoning, food from unknown source and improper handling of food.
9. 70% of consumers have a neutral or favorable impression of using biotechnology to produce foods.
10. On average, 50% of Indian consumers surveyed are aware about biotechnology.

See the full article at [http://afic.org/2008/idealsEngine/\\_filesmgr/File/Consumer%20perceptions%20of%20food%20biotechnology%20in%20India.pdf](http://afic.org/2008/idealsEngine/_filesmgr/File/Consumer%20perceptions%20of%20food%20biotechnology%20in%20India.pdf).

We welcome reader comments or suggestions. E-mail your letters to: [nringma@agbios.com](mailto:nringma@agbios.com) Mail your letters to: The Editor, SABP Newsletter, P.O. Box 475, Merrickville, Ontario, K0G 1N0 Canada

A recently published article may be of interest to readers of the SABP newsletter.

### PLANNING ENVIRONMENTAL RISK ASSESSMENT FOR GENETICALLY MODIFIED CROPS: PROBLEM FORMULATION FOR STRESS-TOLERANT CROPS

Plant Physiology, June 2008, Volume 147(2), pp 494-502.

A scientifically sound environmental risk assessment is required for crops derived from modern biotechnology (also referred to as genetically modified [GM]) prior to unrestricted release into the environment. The scientific principles underlying the environmental risk assessments completed for herbicide-tolerant and insect-protected GM crops commercialized to date are now being applied to crops currently under development that are modified for improved tolerance to abiotic stresses. These principles, and the processes built upon them, have been shown to be sufficiently robust to provide the appropriate information for regulatory decision making and to ensure an adequate level of environmental protection. This article describes the initial steps in the environmental risk assessment process and illustrates an approach that could be taken for GM crops tolerant to an abiotic stress (e.g., water, salt, cold, and heat). The discussion below begins with an overview of the initial steps in an environmental risk assessment, known as problem formulation (US EPA, 1998). A general overview describing how problem formulation has been applied for the first GM crops is presented next. Finally, the approach is applied to a hypothetical drought-tolerant maize (*Zea mays*) product as an example of how problem formulation can guide the environmental risk assessment for a specific abiotic stress tolerant crop.

Recent advances in functional genomics have led to the discovery of genes associated with tolerance to abiotic stresses such as cold, heat, water, and salt (Vij and Tyagi, 2007). Some of these genes show promise in major crops like maize (Nelson *et al.*, 2007) and rice (*Oryza sativa*; Hu *et al.*, 2006). As such, a discussion on planning an environmental risk assessment of GM abiotic stress-tolerant crops is timely. Regulators are now confronting the challenges involved in evaluating data from these new and potentially beneficial products. Products expressing stress tolerance phenotypes are now being widely tested in field trials around the world. Very soon, technology providers will submit data and information on GM crops with stress-tolerant phenotypes to regulatory authorities for review that will include an environmental risk assessment as part of a request for commercial release.

See the full article at <http://www.plantphysiol.org/cgi/content/full/147/2/494> or download the PDF at <http://www.agbios.com/docroot/articles/08-176-001.pdf>.

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