



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.

## CONTAINMENT OF A GENETICALLY MODIFIED ORGANISMS

Dr. K.V. Prabhu, National Phytotron Facility, IARI, New Delhi

[Editor's note: The following article complements the editorial about the National Phytotron Facility (NPF) that Dr. Prabhu contributed to the May 2007 issue of the SABP newsletter.]

The development of genetically modified organisms (GMOs), their storage, culture, use, transport and destruction requires that they be contained using a system of physical barriers, possibly supplemented by chemical or biological barriers, that will restrict the escape or release of the GMO into the environment. In India the guidelines for the containment of GMOs are provided by the Department of Biotechnology (DBT) through its Review Committee on Genetic Modification (RCGM).

The following information is normally required to assess the risk of a GMO causing any harm to human or animal health or to the environment and ecology:

- a) Properties of the GMO, to determine if there are any potential hazards to human or animal health and the environment;
- b) the likelihood that the GMO could actually cause harm based on the biology of the host organism and the genes added;
- c) the containment level necessary to prevent an escape of the GMO until it is proven to be safe;
- d) assignment of any additional containment measures deemed necessary for effective control of GM material.

Using these criteria, the GMOs are classified into one of three categories according to the potential risk they pose



Second entry level to the NPF where every individual is air showered and vacuumed to remove any particulate contamination.

to human health and the environment. The categories are as follows:

**Category I:** This category includes routine cloning of defined genes, non-coding stretches of DNA and open reading frames in *E. coli* or other bacterial and fungal hosts that are generally considered as safe (GAS) to humans, animals and plants. Researchers carrying out Category I experiments need to notify the Institutional Biosafety Committee (IBSC) of the procedures. This category involves contained laboratory experiments and includes the following:

- i) Routine cloning of defined DNA fragments of microbial, animal and plant origin in GAS organisms;
- ii) transfer of defined cloned genes into *Agrobacterium*;
- iii) use of defined reporter genes to study transient expression in plant cells;
- iv) molecular analysis of transgenic plants grown *in vitro*.

**Category II:** This category includes contained laboratory, greenhouse and nethouse experiments where defined DNA fragments that are nonpathogenic to humans and animals are used for genetic transformation of plants. Model and crop species are grown in greenhouses and nethouses for molecular and phenotypic evaluation. This category includes the experiments described below:

(continued on page 2 - see Containment)

## CALENDAR OF EVENTS

INDIA			
Event	Organization	Date	Place
Training programme for customs officials	GEF - World Bank	June 18 and 19, 2007	National Academy of Customs, Excise and Narcotics (NACEN), Mumbai
Training programme for African nationals on 'Application of Biotechnology and its Regulations'	Indian Technical and Economic Cooperation and TERI University	July 27 to August 17, 2007	TERI RETREAT, Gurgaon, Haryana

### Containment - continued from page 1



Transgenic cucumber in a greenhouse at the NPF.

- i) Transgenic organisms with constitutive, tissue specific and chimeric promoters used for expression studies;
- ii) laboratory, greenhouse and nethouse experiments using transgenic plants with marker genes; herbicide resistance genes; heterologous genes that confer resistance to biotic and abiotic stresses (*i.e.* genes with chalcone synthase, heat shock proteins, chitinase, protease inhibitors, *etc.*); genes from plants, animals and microbial sources that would confer resistance to plant pathogens; genes for the production of antibodies; transposable elements for gene tagging in crop species or model species.

**In India**, permission for performing Category II experiments will be provided by the IBSC. The IBSC decision will be submitted to RCGM, which will keep this information on record.

**Category III and above:** This category pertains to higher risk experiments where the escape of transgenic traits into the open environment could cause significant alteration to the biosphere, ecosystems, plants and animals by dispersing new genetic traits, the effects of which cannot be precisely determined. All experiments conducted in greenhouses that do not belong in Categories I and II, would fall under Category III risks. These experiments would require clearance from the RCGM and should be approved by the DBT.

#### Biosafety Levels

**Based** on the category of risk and the nature of the transgenes, the contained facilities are built for degrees of Biosafety Levels, the lowest being BL 1 and the highest BL 4.

**Biosafety Level 1 (BL 1):** This level is suitable for work with agents of minimal hazard to laboratory personnel and the

environment. The work is conducted on open bench tops. Special containment equipment is not required or generally used. The greenhouse floor need not necessarily be impervious but the walkways should be of impervious material.

**Biosafety Level 2 (BL 2):** The access to the greenhouse is restricted to individuals directly involved with the experiments. Decontamination of runoff water is not necessarily required. The floor and walls of the greenhouse should be treated periodically to eliminate any entrapped organisms in the gravel or grooves. The floor is composed of an impervious material. Soil beds are acceptable unless propagules of experimental organisms are readily disseminated through soil. Windows and other openings in the walls and roof of the greenhouse facility may be open for ventilation as needed for proper operation and do not require any barrier against pollen or microbes, but screens are required to prevent entry of insects, birds and animals.

**Biosafety Level 3 (BL 3):** Prior to entering the greenhouse, personnel are required to pass through a set of two self-closing, locking doors. Disposable clothing like aprons must be worn before entering the greenhouse. The hallway leading to the greenhouse is part of the contained facility. Negative pressure must be maintained. The floor should be composed of concrete or other impervious material and should have provision for collection and decontamination of run off water. Windows must be sealed and all glazing must be resistant to breakage. The entrance points for plumbing and utilities need to be sealed. The supply and exhaust airflow should ensure inward or zero airflow at all times.

**Biosafety level 4 (BL 4):** BL 4 is known as the maximum containment level. Personnel must enter the greenhouse facility only through the clothing change and shower rooms and must shower each time they leave the facility. An outer and inner change room separated by a shower must be provided for personnel entering and exiting the facility. Windows must be sealed to permit fumigation. All plant material leaving the greenhouse must be autoclaved. The material must not be brought through the change rooms but through a ventilated airlock. The supply and exhaust airflow must ensure inward air flow at all times. HEPA filters must be provided to treat air supplied and exiting the facility. All liquid effluents must be decontaminated.

### THREE-DAY INTERNATIONAL CONFERENCE ON BIOTECHNOLOGY HELD IN DHAKA

Prof. A.S. Islam, Retired Professor, Botany, DU

**The** three-day conference, "Promotion of Biotechnology in Bangladesh: National and International Perspectives", concluded on a very confident note on April 8, 2007, in Dhaka. A number of distinguished foreign and non-resident Bangladeshi scientists from Australia, Canada, Malaysia,

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**Dhaka - continued from page 2**

Pakistan, Saudi Arabia, Turkey, and the United States enriched the conference with their valuable input. There were 50 oral presentations and 72 posters on display, which were of high quality, both in terms of theme and style. The conference abstract is available online at <http://promotebiotechbd.net/Abstract-book.pdf>.

The chief guests were, at the inaugural session, Mr. Tapan Chowdhury, Advisor, Ministry of Science, Information and Communication Technology (MoSICT) and, at the concluding session, Dr. David Sack, Director, Centre for Health and Population Research (ICDDR,B).

A position paper on "National Biotech Policy", based on comments of the biotechnology community both domestic and abroad, was prepared and presented to elicit the opinion of the biotech audience. A number of enthusiastic responses was received.



The final document, which embodies the suggestions, is ready and expected to be submitted shortly to the three concerned government departments: MoSICT, Ministry of Health and Family Planning and the Ministry of Environment and Forestry. After the conclusion of the conference a delegation of four, led by Prof. Jamilur Reza Choudhury, Vice Chancellor of BRAC University, called on the Science and Information Minister requesting that he implement the revised policy including enforcement of biosafety policy through legislation. The advisor assured the delegation of his help with the implementation of the resolutions contained in the position paper.

The major recommendations comprise establishment of a separate commission of biotechnology with an independent secretariat and financial freedom; immediate enactment of biosafety laws, allowing import of transgenic crops such as cotton, soybean, corn, vegetables and fruits, etc.; relaxation of customs rules regarding the import of perishable items; reduction of duties on imported scientific appliances, chemicals, enhancement of total compensation to encourage non-resident Bangladeshi biotechnologists to return to Bangladesh and actively take part in research programs; organization of a high-powered stakeholders workshop to tailor research programs to meet the country's urgent need for overall economic benefit. Finally, the committee strongly recommended that the Government of Bangladesh apply to the World Bank and the Academy of the Developing World

for funds to establish a Millennium Institute for Promoting Biotechnology and Information Technology.

### TRAINING PROGRAMME FOR AFRICAN NATIONALS TO BE HELD AT TERI UNIVERSITY

TERI University is pleased to announce a training programme for African nationals, 'Application of Biotechnology and its Regulations', which will be conducted at TERI from July 27 to August 17, 2007. The program is sponsored by Indian Technical and Economic Cooperation (ITEC), Government of India. All expenses related to participation will be borne by the Government of India. A moderate per diem will be provided to the participants.

The programme will focus on agriculture biotechnology techniques and the status of acceptance of these new technologies. In addition to traditional biotechnology such as tissue culture propagation (micropropagation), the programme will address the use of biofertilisers and biopesticides (for organic agriculture), issues related to plant variety and farmer's rights in the context of globalisation. Modern biotechnology based on molecular marker breeding and genetic engineering will be discussed in detail covering both the technology and global acceptance. Biofuels will also be dealt with in detail investigating existing identified species and future growth using biomass and agriculture waste. The faculty for this course will be drawn from experts at TERI and other institutions.

Candidates, who must be African nationals, are encouraged to apply to the Indian Embassy in their country, providing a copy addressed to the undersigned. Application deadline is June 25, 2007. A programme brochure and application can be obtained by contacting:

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### PAPER 'THE ECONOMICS OF GM FOOD LABELS: AN EVALUATION OF MANDATORY LABELING PROPOSALS IN INDIA' NOW AVAILABLE

A discussion paper, 'The Economics of GM Food Labels An Evaluation of Mandatory Labeling Proposals in India', by Sangeeta Bansal, Jawaharlal Nehru University, and Bharat Ramaswami, Indian Statistical Institute, has been released by the International Food Policy Research Institute (IFPRI). It is available to download as a PDF from the IFPRI website at <http://www.ifpri.org/pubs/dp/IFPRIDP00704.pdf> or at the SABP website at <http://www.agbios.com/docroot/articles/07-165-001.pdf>.

Labeling of genetically modified (GM) foods is a contentious issue and internationally, there is sharp division whether such

## Mandatory Labeling - continued from page 3

labeling ought to be mandatory. This debate has reached India where the government has proposed mandatory labeling. In this context, this paper evaluates the optimal regulatory approach to GM food labels. Mandatory labeling aims to provide greater information and correspondingly more informed consumer choice. However, even without such laws, markets have incentives to supply labeling. So can mandatory labeling achieve outcomes different from voluntary labeling? The paper shows that this is not the case in most situations. The paper goes on to explore the special set of circumstances where mandatory labeling makes a difference to outcomes. If these outcomes are intended, mandatory labeling is justified; otherwise not.

### USE BIOTECH TO BOOST FARM PRODUCTIVITY: CHIDAMBARAM

India eNews - June 7, 2007

**Finance Minister P. Chidambaram Thursday [June 7, 2007] exhorted the biotech sector to enhance agricultural productivity and achieve self-sufficiency in food supplies.**

**Inaugurating the three-day Bangalore Bio 2007 here [Karnataka], Chidambaram said the sector should achieve breakthroughs in agriculture research to increase productivity, improve quality and ensure better returns on farmers' investment.**

**'At a time when the services sector is growing by 30 percent, the manufacturing sector by 12 percent per annum, the slow growth rate (2.4 percent) in the agriculture sector and stagnant food production is a cause for concern,' he said.**

**Though the biotech sector has achieved remarkable breakthroughs in pharma and cash crops such as BT cottonseeds, the need of the hour is to step-up yields of rice, wheat, pulses and oilseeds to meet the growing demand for essential commodities and check the price rise, according to the finance minister.**

**'No country as large as India with over a billion mouths can expect to meet the food needs by imports, which can only be a temporary measure. The total acreage of land for cultivating basic food crops such as wheat and paddy (rice) has remained stagnant for long. Production also remained**

near stagnant and below world average. Yield gaps vary between states as well as crops.

**'It is the biotech sector which can usher in the second green revolution by applying biotechnology and bio-resources in food crops as it has been doing of late in cash crops like BT cotton. The challenge for Indian scientists is to replicate the breakthroughs in food crops, while addressing concerns about genetic engineering at the same time,' Chidambaram told about 800 delegates participating in the trade event.**

**With the GDP growing at eight-nine percent and demand for food articles growing, thanks to the increasing purchasing power and greater consumption, the government had been forced to import wheat, pulses and oilseeds to check the price rise and moderate inflation.**

**'Instead of exporting rice and wheat, we are importing pulses and oilseeds to bridge the demand-supply gap and control prices. To reverse the situation, biotechnology and bio-resources have to be invested in food crops to not only meet the growing demand, but also achieve self-sufficiency to avoid imports,' Chidambaram pointed out.**

**Lauding the achievements of the sector in bio-pharma, bio-informatics and bio-research leading to drug discovery, new molecules and clinical development, the finance minister said the 35 percent growth achieved in the last fiscal (FY 2007) had pitch-forked India to the third position after Japan and South Korea in the Asia-Pacific region.**

**'I have no doubt the sector will move to the frontline of bio-pharma on global scale. Besides balancing cost, quality and effectiveness of generic or new drugs, pharma companies have to find cures for dreaded diseases such as HIV, AIDS and hepatitis,' Chidambaram noted.**

**Admitting funding and talent resource were critical to the rapid growth of the biotech sector, he said the government would address the early stage funding issue and facilitate building the human capital by the industry as well as the academia.**

**'We are aware of the problem. We have already amended the Income Tax Act to channel venture capital into high-risk funding from low-risk,' the minister added.**

### READER FEEDBACK

Thank you for the regular news letter. I enjoy reading and I appreciate for all your trouble and time. - *Ugen Tenzin, Government of Bhutan*

Thanks for sending me the April 2007 issue of the SABP Newsletter. This is very useful and kindly continue sending the same. - *Dr. Arvind Kumar, Director, National Research Centre on Rapeseed-Mustard, ICAR, Rajasthan, India*

I am extremely grateful to you for regular sending of your Newsletter. This is extremely helpful for my research purpose. - *Dewan Muhammad Humayun Kabir*

Thanks for newsletter. - *Farid Uddin Ahmed, Member Director (NRM), Bangladesh Agricultural Research Council*

Thanks. I enjoy reading it. - *Govind K. Garg*

Thank you very much for sending SABP August 2006 newsletter. I am really happy to receive the newsletter. I hope this will continue. - *Prof. Md. Raihan Ali, Biotechnology and Genetic Engineering Discipline, Khulna University, Bangladesh*

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

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