

GM technology, in which a gene is transferred from a different species to imbibe a desirable trait, is touted as a long-term solution to the problems of pests, hunger, drought and even climate change. Though the technology warrants serious consideration, the uproar over Bt brinjal has served to highlight a very important issue of public interest.

BT BRINJAL: ON HOLD FOR NOW...

We call it the brinjal. Other countries know it as the eggplant or aubergine. It is widely used the world over and every cuisine from the Chinese to the African has an encyclopaedia of recipes that establishes its popularity as a vegetable of daily use. And no vegetable has hogged the headlines as much as the brinjal in recent years - ever since Mahyco, the Indian partner of the biotech giant Monsanto, began its experiments to turn this commonly used vegetable into the genetically modified Bt brinjal. In recent months, it has seldom been out of the news in this country because of the controversy surrounding questionable procedures for testing and approval, and a high-profile case in the Supreme Court.

Giving in to intense opposition from NGOs and several states, government has put a hold on commercial cultivation of genetically modified brinjal citing lack of clear consensus within the scientific community.

Environment Minister Jairam Ramesh announced the decision to put a moratorium on the release of Bt-Brinjal on 8th Feb 2010, till such time independent scientific studies establish, to the satisfaction of both the public and professionals, the safety of the product from long-term view on impact on human health.

Contrasting Views

Jairam Ramesh

Minister for Environment & Forest

"The truth is that Bt Brinjal is not about food security. Brinjal has never been scarce in the market and it continues to be one of the cheapest vegetables on the cart of my vegetable vendor. The Bt variety is more of a trial balloon to see how Indians take to genetically modified food before bringing in the real moneymakers.

The interest lies in launching Mahyco's Bt rice and wheat (both are on the way) - two crops that are part of the Indian staple diet. But that too is not about ensuring food security. Those campaigning for enhancing food security would rather focus on reducing post-harvest waste in the state's granaries.

As per a RTI reply in 2008, more than 1,300,000 tonnes of food grain were wasted in the last 10 years in the granaries of Food Corporation of India. That could have fed over one crore people for a year or over 6 lakh individuals across the span of a decade".

Q&A: Bt Brinjal by Debarshi Dasgupta, Outlook, 11 Feb 2010, <http://outlookindia.com/article.aspx?264269>

Sharad Pawar

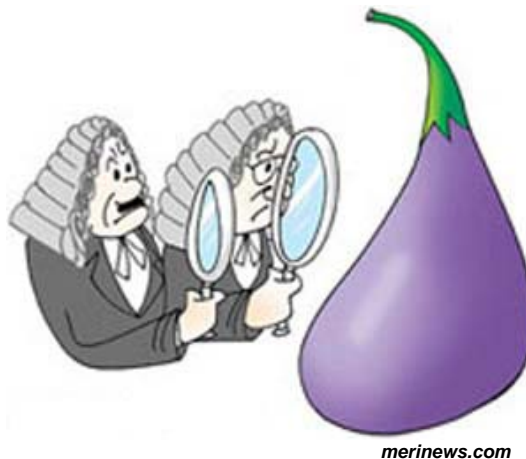
Minister for Agriculture

"If the introduction of Bt Brinjal will be in the larger interest of the country, farmers and for the food security at large, it should happen," Sharad Pawar Union agriculture minister, said. GEAC, the environment ministry-appointed committee, has found out that Bt Brinjal is not harmful.

The agriculture minister suspected the involvement of the pesticide companies, if any, in opposing the introduction of Bt Brinjal. He asserted that the introduction of the genetically-modified Brinjal can take place as it has been recommended by Genetic Engineering Approval Committee (GEAC), a scientific body, after carrying out a series of trials and tests on its impact on nature.

"Farmers do not go by such opposition but they always weigh what is beneficial for them and for the country as a whole," Pawar said.

Sharad Pawar bats for Bt Brinjal, raps its opponents by Sanjay Jog, Mumbai February 05, 2010, <http://www.business-standard.com/india/news/sharad-pawar-bats-for-bt-brinjal-raps-its-opponents/384703/>



- India produces about 7.6 million tonnes of brinjal from 472,000 hectares with an average productivity of 16.3 tonnes per hectare
 - Major brinjal producing states are Orissa, Bihar, Karnataka, West Bengal, Andhra Pradesh, Maharashtra and Uttar Pradesh
- India ranks second to China in the global production of brinjal with a share of 26 per cent
- Its roots and stems are used in traditional preparations. This is used largely in treatment for rheumatism, asthma and heart disease
 - Brinjal is also considered a common home remedy for Type 2 diabetes

A short history of BT Brinjal



- 2000** Breeding for integration of Bt gene-Cry1Ac-into brinjal hybrids
- 2001-02** Preliminary evaluation to study growth, development and efficacy of Bt brinjal
- 2002-04** Field trials begin
- 2004-05** Data on the effects of Bt brinjal on soil microflora efficacy against fruit-shoot borer, pollen flow and chemical composition submitted to the Review Committee on Genetic Modification (RCGM)
- 2004** RCGM approves conducting multi-location research trials of eight Bt brinjal hybrids
- 2004-07** Multi-location research trials conducted by Mahyco and All India Coordinated Vegetable Improvement Project under the Indian Council of Agricultural Research
- 2006-07** Data submitted to Genetic Engineering Approval Committee (GEAC)
- 2007-08** GEAC approved eight Bt brinjal hybrids for large-scale field trials. Trials conducted
- 2008-09** GEAC approved the experimental seed production of seven Bt Brinjal hybrids on 0.1 acre per hybrid
- 2009** Under consideration for commercial release
- 2009** - October GEAC clears Bt Brinjal for commercial cultivation
- 2010** - Jairam Ramesh announces a moratorium

source: bloglovin.com

Jairam's reasons...

The morning after announcing the moratorium on Bt brinjal, a visibly relaxed environment minister Jairam Ramesh spoke to Outlook. Excerpts:

A rethink on GM in agriculture: The moratorium has nothing to do with the future of GM technology in agriculture, which is a decision that has been taken at the highest level. GM is an important element, but not the only route to food security. So we are not abandoning GM in agriculture.

Addressing multiple concerns: In such matters you cannot rely only on the scientists. Science does not function in a social or political vacuum. There are political questions involved. There are social and health issues involved. So I don't think you can take a pure scientific view on such matters. Concerns arose largely because in hybrids you have to buy seeds year after year. Also, because of the Monsanto connection, there was wide public fear which would not have been the same had the public sector developed the varieties.

Private versus public players: No, I am not asking for differential standards because the same health yardsticks would apply to both. The pub-

The decision on Bt Brinjal also has to take note of the Public Interest Litigation filed with the Supreme Court which is pending response from the Union of India on the steps taken to protect traditional crops. It is also relevant that the Supreme Court has invoked the precautionary principle as a guiding instrument in environmental decisions.

lic sector Bt could be as toxic as a private sector Bt. I think farmer confidence would be enhanced if he did not have to buy new seeds year after year.

Liability for violations: There's a big question, as we do not have liability laws. Take contamination, for example. We don't have liability laws to deal with it. I hope we will use this moratorium period to discuss these

issues and put in place rules and regulations.

BT brinjal and food security: It would appear that BT technology is a solution in search of a problem. I think it should be the other way round. If I had been in-charge from day one, the first question I would have asked is, "Why Bt Brinjal?" It does not seem right to me. There is no great shortage of brinjal. There is no overriding food security issue. But I couldn't raise those issues as 7-8 years have already passed since work on Bt brinjal started.

Biodiversity concerns: Diversity is a very important issue for brinjal, as India is its centre of origin. Madhav Gadgil and M.S. Swaminathan have spent decades studying biodiversity. It is not a narrow bioengineering view that we have to take but a holistic view on conservation of biodiversity.

'GM Isn't Only Route To Food Security', Outlook, 15 Feb 2010, <http://www.outlookindia.com/article.aspx?264279>

Who owns BT Brinjal?

Almost forgotten in this tumult is the work of several public institutions, primarily the Tamil Nadu Agricultural University (TNAU) in Coimbatore and the University of Agricultural Sciences (UAS), Dharwad, in genetically modifying the open pollinated varieties (OPV) of brinjal whereas Mahyco is focused on doing it with hybrids. Of course, both institutions have been working with Mahyco on the project in what is described as a public private partnership (PPP), spearheaded by Cornell University of the US as the ABSPII project. Funding for the project comes from the Ford Foundation and USAID.

The Bt cry1Ac gene technology was sublicensed to these universities and other public institutions in Bangladesh and the Philippines among others on a pro bono basis, but several concerns remain to be addressed.

Who really owns the nearly dozen OPVs that the two agriculture universities have used in the Bt experiments? What would be the nature of intellectual property rights (IPRs) that the developers would enjoy given that the technology is owned by Mahyco - a

company in which Monsanto has a 26 per cent stake - and how soon would the universities be allowed to release their seeds? These are critical issues that need to be answered since only a quarter of the nation's brinjal farmers are known to be using hybrid seeds. There is a simple reason for that: OPVs, produced by natural pollination, allow farmers to reuse their seeds unlike with hybrids where cultivators need to go back to the companies every planting time for expensive proprietary seed.

A copy of the Material Transfer Agreement signed between TNAU and Monsanto in March 2005 reveals some interesting facts. The university says it has supplied to Mahyco "eggplant germplasm developed by, owned, controlled and/or licensed-in by TNAU". But can the university claim ownership of the original germplasm which would have come from the farming community? Was their permission sought and granted when such an agreement was being drawn up? And would the benefits, if any, be shared with this community when commercialisation takes place?

Agriculture experts also question if TNAU can claim to own and control this germplasm when no legislation allows it as of now. Did the university register these OPVs? Farmers' lobbies say if this is indeed the case, then it should show proof of how and when control and ownership were obtained from the donors/breeders for the germplasm of the essentially-derived varieties as they are termed otherwise, and also if it would amount to a serious violation of farmers' rights.

Equally significant is the compact between the university and Mahyco which is aimed at developing and delivering "pro-poor varieties of insect-tolerant Bt eggplant to facilitate technology access to resource-constrained farmers". Pro-poor varieties of Bt eggplant? That's an intriguing term but what is germane here is the fact TNAU can only deliver the "products" (Bt varieties) to farmers by a further agreement with the company.

The restrictions on the university are many: TNAU cannot back cross the Bt gene into any other germplasm apart from the four selected varieties; it cannot further develop

transgenic eggplants with "products" it derives from the partnership nor can it do any breeding work with these products. On the other hand, Mahyco has reserved for itself "certain rights to the use of the Bt gene".

It's good to remember the overarching philosophy of ABSPII. The project document states that "to safeguard the licensor's interests, specific strategies for the stewardship and monitoring of the technology by the licencees was addressed and formulated early in the sublicensing programme". So while references to pro-poor varieties sounds impressive, it's important to remember that IPRs extract a price - from the licensees, sub-licensees and the customer.

So the question of who owns the products is as important as the question of who owns the germplasm.

Who owns the eggplant? by Latha Jishnu, Business Standard, December 10, 2009.

<http://www.business-standard.com/india/news/latha-jishnu-who-ownseggplant/379041/>

Brinjal is a very important common man's vegetable in India. After potato, it ranks as the second highest consumed vegetable in India, along with tomato and onion. A total of 1.4 million small, marginal and resource-poor farmers grow brinjal on 550,000 hectares annually in all the eight vegetable growing zones throughout India.

It is an important cash crop for poor farmers, who transplant it from nurseries at different times of the year to produce two or three crops, each of 150 to 180 days' duration. Farmers start harvesting fruits at about 60 days after planting and continue to harvest for 90 to 120 days, thereby providing a steady supply of food for the family; it also provides a stable income from market sales for most of the year. Brinjal was one of the first vegetable crops adopted by farmers as hybrids, which occupied more than 50% of the brinjal planted area of 550,000 hectares in 2007, the balance being planted with openpollinated varieties. Brinjal is marketed in different sizes, shapes and colors to meet consumer preferences. Of the global production of 32 million tons (1ton=1,000kg) of brinjal produced on 2 million hectares worldwide annually, India produces 8 to 9 million tons, equivalent to one quarter of the global production, which makes India the second largest producer of brinjal in the world, after China.

Brinjal is a hardy crop that yields well under stress conditions, including drought. Productivity has increased from 12.6 tons per hectare in 1987-88, to 15.3 tons per hectare in 1991-92 to 16.5 tons per hectare in 2005-06. Although the centre of origin for brinjal is not known for certain, cultivated and related wild species of brinjal in India represent a broad range of genetic diversity which has likely migrated from India, and China, to other countries in South- East Asia, Africa, Europe and the Americas.

<http://www.isaaa.org/Resources/Publications/briefs/38/executivesummary/pdf/Brief%2038%20-%20Executive%20Summary%20-%20English.pdf>

Science vs. anti-science?

What has been of particular interest in this and past debates on the subject is the way in which those who oppose GM crops are painted as being against science (see for instance, the editorial in *The Hindu* on 21 October, 2009 or *Starved for Science* by R Paarlberg). There is a blatant attempt by GM promoters to polarise the discussion and manufacture a science-vs.-antiscience debate. All those who oppose GM crops are neither anti-science nor luddites. Indeed, many scientists have been, and still are, critical of GM for a number of good reasons. Scientists and scientific academies, including the National Research Council of the US National Academy of Sciences, have expressed serious concerns regarding the scientific rigour of experiments and the impacts of GM crops, especially on biodiversity.

Those who support GM crops generally believe that science and technology can solve most problems, and see crops as requiring tinkering to improve agriculture. It is such short-term and piecemeal thinking that led to the excesses of the Green Revolution causing damage to soils, depletion of ground water and other harms to ecosystems. There are other supporters of GM who continue to believe that private production of goods and services is inherently superior to public ones, even as governments have been bailing out the private sector in the last year! And then there are those who have financial gains to make if the GM industry prospers

There is general agreement among scientists and academics on the adverse effects on biodiversity as a result of cross-pollination from engineered to non-engineered crops. Still, field trials for GM crops in unmarked areas blow caution and engineered pollen to the winds in closely cultivated fields in India.

The potential damage to human health from GM crops has been shown quite clearly in a few animal systems, but perhaps needs

further study. There is good peer-reviewed published evidence to show that Bt toxins are both immunogens (a substance that provokes an immune response) and immunoadjuvants (a substance that enhances immune response) for mammals. Moreover, studies have shown that Bt toxins bind to the mammalian small intestine and have effects on its proper functioning. The concerns raised by the use of viral promoters, which are hotspots for genetic recombination, the use of antibiotic resistance genes, and strong gene promoters (sequences that facilitate the transcription of a gene) to ensure that the foreign genes are expressed, have already been highlighted by many scientists.

The debate in GM plants is even more deeply suffused by vested interests than that on global warming. In addition to impeding research, companies also exert their influence on review and approval by way of revolving doors between agribusiness and regulators. Furthermore, outright threats came to light in the UK in 2003 when the government decided to hold panels to review GM foods. According to *The Guardian* "Dr Andrew Stirling, of Sussex University and a member of the Government's GM science review panel, was warned by a leading member of the scientific establishment his career would be ruined unless he stopped questioning the technology's safety. The pro-GM scientist tried to get Stirling removed from a research project by approaching its funders."

Developing countries such as India with its large population and huge potential for markets are very attractive to agribusiness. In India where the vast majority of the people still depend on agriculture for their livelihood, and where diverse ecosystems and crop varieties still thrive, control over food security needs to be a top priority that is not be handed over to anyone: corporations, governments or even civil society for that matter.

Given all the confusion regarding GM crops let us recapture a few lessons we have learnt and know for sure in the area of food security and agriculture. Biodiversity is critical to sustainable, healthy agricultural ecosystems; a farmer's ability to control agricultural productivity through ownership of seeds, access to markets and reasonably secure livelihoods is important; and to ensure food security, storage, distribution and purchasing power have

to be part of the picture. For instance, India imported lentils recently to tide over its needs. Some agricultural experts suggest that improved storage methods would have made these imports unnecessary.

In essence, we need a systems approach to agriculture and food security instead of viewing them as requiring mere technical fixes. Thus while various technologies and innovations - such as better rural credit systems, improved methods to capture and store rainwater, and development of implements to enable women to work more easily in the fields - will remain crucial to agriculture, these developments must support the critical elements.

GM CROPS Where is the science? by Sujatha Byravan, *India Together*, 06 Nov 2009, <http://indiatgether.org/2009/nov/agr-gmsci.htm>

Fudging Facts

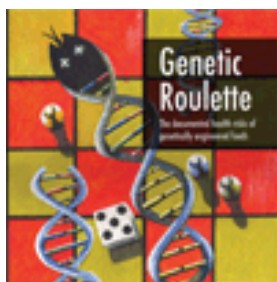
While it appears the Mahyco has conducted a number of studies to show that Bt brinjal is safe to eat, in fact none of the studies are of any real use, for the following main reasons:

1. The type of studies undertaken are insufficient to be able to determine if GM brinjal is safe to eat.
2. Of those studies undertaken, the methodology and results are often insufficiently reported to be able to determine safety of BT Brinjal
3. The sample sizes are insufficient to be able to find statistical difference for many measurements.

Consequently, the studies presented by Mahyco cannot be used to show that GM brinjal is safe to eat, particularly when population health issues are taken into account

From A review of Mahyco's GM Brinjal food safety studies Dr Judy Carman, The Institute of Health and Environmental Research Inc. January 2009.

<http://www.indiaenvironmentportal.org.in/files/A%20review%20of%20Mahyco.pdf>



SAGE, distributed by The Other India Bookstore, Next to New Mapusa Clinic, Mapusa-403507, Goa. Rs.475.

GENETIC ROULETTE -

The Documented Health Risks of Genetically Engineered Foods: *Jeffrey M. Smith*

The book provides a good starting point for anyone interested in knowing the darker side of GM food. It shows why GM science is such a contentious issue.

It takes the readers through a journey that will inevitably shock them. Several strategies that companies use to get favourable results are clearly explained. It almost serves as a compendium on the ill-effects of GM food on animals and humans. It very clearly explains how GM food companies resort to surrogate testing of proteins extracted from bacteria instead of testing those taken from GM plants. While it provides a wealth of information, the biggest drawback is that the book is too judgmental.

Bt Brinjal Approval Rigged?

Now it can be told. The environmental clearance by an Expert Committee (called EC-II) set by the Genetic Engineering Approval Committee (GEAC) to accord approval to the controversial genetically modified crop -- Bt brinjal -- was actually rigged. This was never in doubt, except that this time Kavitha Kuruganti of the Coalition for GM Free India has very meticulously joined the dots to bring out this shocker.

As a consumer, you need to understand how you are likely to be served poisonous food by a bunch of people (who operate in the name of scientists) whose only job is to promote the commercial interests of the private seed and biotech companies. The conflict of interest of most of the members of the EC-II

comes out clearly in this exposure.

The entire regulatory system has in fact become subservient to the US interests. The Indian Council for Agricultural Research is now completely in the hands of the US Artificial Insemination Department (USAID), and so is the Department of Biotechnology. And if you think the Ministry for Health and Family Welfare is any better, you just have to walk into the corridors of the ministry. You can hear the whispers clearly.

Ever since the Indo-US Knowledge Initiative in Agriculture, Research and Marketing (KIA) was put into place (almost the same time the Nuclear treaty was signed), the ICAR does exactly what the USAID wants it to do. The outgoing Di-

rector General Dr Mangla Rai is merely a figure head, an Indian face for the American operations

Prof Arjula Reddy, the Chair of the Committee:

In a phone conversation to Dr Pushpa Bhargava, Prof Reddy is supposed to have told Dr Bhargava, sometime in the first week of October (?):

- that eight of the tests that Dr Bhargava said should be done on Bt Brinjal and with which Prof Reddy agreed, had not been done;

- that even in the case of tests that have been done, many have not been done satisfactorily and adequately;

- that he (Prof Reddy) was under 'tremendous pressure' to clear Bt Brinjal and had calls from 'Agriculture Minister, GEAC and industry'.

Attached is a note/affidavit from Dr Bhargava on this matter (Annexure 2). Prof Reddy has also been quoted in a Tehelka article on Bt Brinjal recently in the following manner:

When asked if there was any proof Bt brinjal was safe, he replied, "What we require is long-range research done over many years. That does not exist (for Bt brinjal)." Then why give the clearance if the required research is absent? "All the approved protocols by the government has been fulfilled by the developers and the public institutions [that participated in the safety assessment]."

India's GM Scandal: Bt Brinjal Approval Rigged by Devinder Sharma, Countercurrents, 30 November, 2009, <http://www.countercurrents.org/sharma301109.htm>

Apart from dangerously inadequate government clearances, what are your other concerns about Bt brinjal?

A whole lot of concerns. For one, India's biodiversity will be gravely tampered with. For example, we have more than 2,400 varieties of brinjal in the country. Brinjal is a highly cross-pollinated crop. So if you have Bt brinjal growing in some field, its pollen can easily get transferred by wind or insects to other fields. Monsanto has itself filed suits against many people in Canada for growing Bt cotton without license, but for no fault of theirs. It's the wind and insects that had carried pollen and created Bt cotton in their fields! Monsanto vs Schmeiser is just one famous case in Canada. The court judgment went in favour of Schmeiser.

The same thing will happen here in India. They say 30 meters is sufficient to separate BT and non-BT brinjal. I don't believe that. There's no way anyone can control the gene flow because you cannot control wind and where insects will fly. And once that cross-contamination takes place, our entire biodiversity will be at stake. Our native brinjal has a wonderful

Do we need BT Brinjal?

A former MD of Monsanto speaks out

property - it can control Type II diabetes. We don't even know what properties Bt brinjal will have once its genetically transformed.

So we are back to inadequate testing and malafide government clearances?

Yes, we need independent long-term trials, thorough research and peer reviews to get a clearer idea of harm and good. In this case, it's the first time such technology is being introduced into a regular food crop. Yet there have been no trials for birth defects in successive generations. Lab rats fed on GM soyabean have apparently developed ulcers and tumours in their kidneys and liver. That's what published research says. Approving Bt brinjal for commercial release the way the GEAC was set to was like letting a genie out of a bottle.

In your opinion, is there any need for Bt brinjal at all?

No, BT brinjal's entry point is itself suspect. The Knowledge Initiative Commission set up under the PM has got three companies as

permanent members, among them Monsanto and Dow Chemicals. So naturally they push their point of view. Bt Brinjal was just the entry point. There is talk of BT rice, wheat, potato and what not. If this had gone through, very soon the whole country would have been Bt-ed! When Hillary Clinton came recently, she made no bones about the fact that she was here with the sole purpose of bending India's agriculture policy to American interests.

In your opinion, is there any need for Bt brinjal at all?

Defenders of Bt crops say it's necessary for our food security. Two decades ago we were applauding the Green Revolution. For a while, with increased pesticide use, crop production went up. But then the land degenerated and we now think of it as a mixed experi-

ment if not complete failure. So it's not good to think of all this only in terms of short term gain. You remember the thyladomide case? Foreign companies would like to introduce a product as quickly as possible, make money as quickly as possible and get out as quickly as possible. It is our government that has to be more cautious and protect our interests. That's where our government and regulatory bodies fail to do their duty.

Go Aheads Came On Monsanto's Data, Tehelka Magazine, Vol 7, Issue 07, Dated February 20, 2010 <http://www.tehelka.com>

Critical Concerns

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Score card

The international debate on GM crops is highly polarized. Its proponents, mostly industry and governments, and think-tanks that lean towards the two, argue GM crops are safe because they are not too different from non-GM crops. This is called the principle of substantial equivalence, which is not very clear in itself, but holds that if a novel or GM food can be shown to be equivalent in composition to an existing food, it can be considered safe.

Anti-GM groups, mostly non-governmental and consumer rights outfits, say the precautionary principle should be used to regulate GM. This requires that proponents of any new technology that may pose a threat to people's health or environment must prove it is harmless before it is accepted.

Bt brinjal could be the world's first GM food crop. Crops like GM corn and GM soy are cleared only for animal feed in the US. But in their processed forms, they are used for human consumption

Given this polarization, and the fact that GM relies intensively on technology, scientific evidence becomes essential. The question is: what did the two studies say that geac had to withhold Bt brinjal's clearance?

The first report, by Gilles-Eric Seralini, a biochemist with the Committee for Independent Research and Information on Genetic Engineering, found that Mahyco had left out statistically significant differences between GM and control groups in its report to the geac (see box: Seralini report).

In the other analysis, the researcher reviewed Mahyco's food safety evaluation of Bt brinjal. Judy Carmen, director of the Institute of Health and Environmental Research, a non-profit working on genetically modified organisms (gmos), found errors in Mahyco's research methodology, which, she said, needs correction (see box:

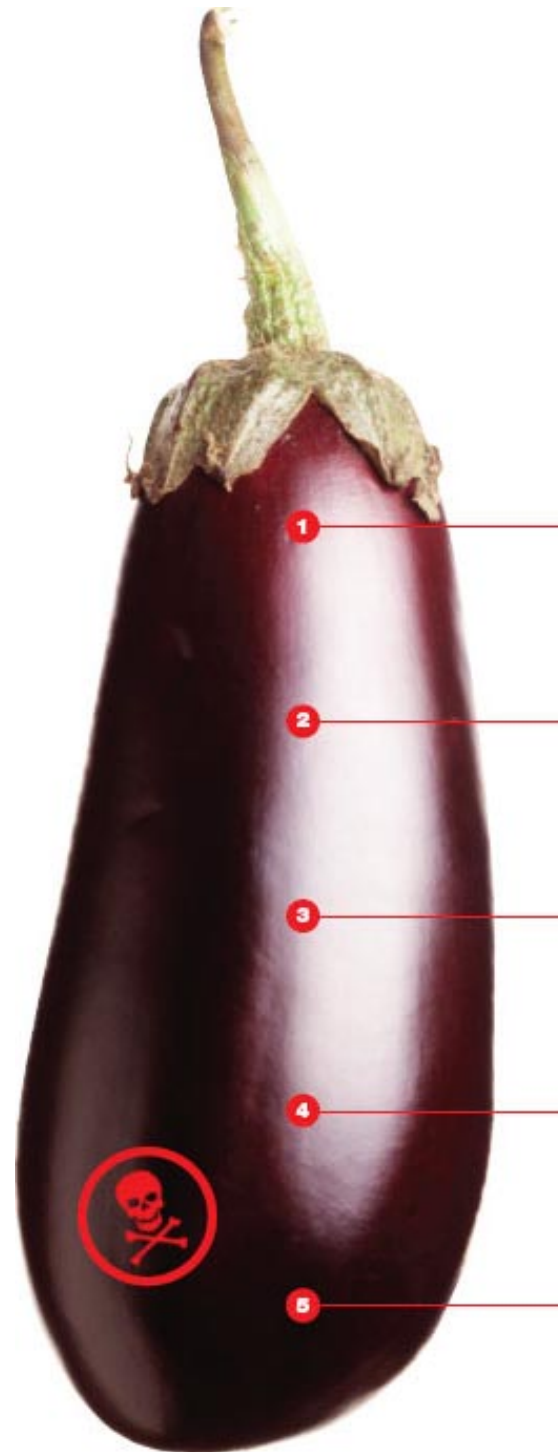
Carmen report). She said Mahyco had not assessed the likelihood of a change in the genetic expression of the plant after the insertion of a gene and that no tests were conducted to determine whether the modified genes could degrade upon cooking or was digestible.

Mahyco claimed it did not find any significant dif-

ference between Bt brinjal and non-Bt brinjal in the biosafety tests. The company said it carried out toxicity and allergenicity studies on rats and its impact on soil microbes. It also assessed the impact on beneficial insects and the environment. Based on these, the geac cleared them for large-scale field trials. But

the data is generated and analyzed by the company itself, said Suman Sahai, geneticist and convener of the non-profit Gene Campaign. "There have been instances when companies have fudged data for obvious reasons."

Test tube brinjal, Down to Earth, 15 April 2009, <http://www.downtoearth.org.in/>



FOOD & PESTICIDE

BT Brinjal is genetically modified to produce a pesticide inside the plant that can not be washed away. Could become the first GM food crop available for direct human consumption

UNHEALTHY RISK

Process used to make it can produce novel and toxic chemicals than can cause cancer Parkinson's disease and birth defects. It could make you immune to medicines

MISSING BRINJALS

India is where the brinjal originated and is recognised as a bio-diversity hot-spot for the plant, having the largest variety of it anywhere in the world. Those varieties could disappear

FALSE ASSESSMENT

Top international scientist have called the biosafety study unprofessional, unscientific and false. Tests not verified by independent authorities. Risks not rules out.

WE DON'T NEED IT

There is not shortage of Brinjal. We overproduce it. There are alternative ways of managing pests that use a little or no chemicals and are free of catastrophic risks.

Can we trust GM Technology?



source: chinadaily.com.cn

Not only are the consequences of genetic engineering unpredictable, the technology itself is unpredictable. It has been falsely projected by the biotechnology industry that because the manipulation of plants is at the genetic level, genetic engineering is more accurate and precise than conventional breeding. This is not true.

There are only two tools used for current genetic engineering - one is the gene gun, the other is a plant cancer, *Agrobacterium tumefaciens*. The uncertainty of the technology is the reason that antibiotic resistance marker genes are used to separate the cells whose genome absorbed the foreign gene from those that do not. The Bt Brinjal uses a gene, Cry 1 Ac, to produce a toxin from a soil organism - *Bacillus Thurengensis* (Bt) - as well as two antibiotic resistance marker genes. The NPT11 gene confers resistance to the antibiotics Kanamycin and Neomycin; The AAD gene confers resistance to antibiotic resistance marker genes to separate the cells that absorbed the Bt gene from those that did not.

But to assess bio-safety, safety tests also need to assess the transgene, i.e the Bt Gene Cry 1Ac plus antibiotic resistance marker genes (NPT11 plus AAD) plus the viral promoter (Ca MV3 35S) plus the vector (*Agrobacterium*, which is used to carry the Bt gene into the brinjal).

However, the tests on bio-safety of Bt Brinjal done by Monsanto/Mahyco and approved by GEAC have not tested Bt Brinjal at all. They have only tested the naturally-occurring and safe microbial Bt. This is a "don't look, don't see" policy.

The safety of microbial Bt sprays cannot be used as proof of safety of transgenic Bt. Bt sprays are composed primarily of endotoxins in an inactive crystalline form. Bt crops on the other hand are genetically-engineered to produce the Bt toxin, which is active without processing.

The "rationale for the development of Bt Brinjal" presented by EC-II is based on the false assumption that genetically-engineered Bt crops like Bt Brinjal are an alternative to the use of chemical pesticides for pest control. The panel does not address the real alternative to chemical agriculture, which is organic farming based on the principles of agro-ecology.

During the moratorium, the government needs to set up interdisciplinary bio-safety assessment systems and inter-ministerial bio-safety regulatory processes which should be independent of the biotechnology industry. This is imperative to protect our food sovereignty and our food democracy.

- **Dr Vandana Shiva**, Executive director of the Navdanya Trust

<http://www.mail-archive.com/greenyouth@googlegroups.com/msg>

"Genetic engineering needs careful assessment because it allows the transfer of genes from one organism to a totally unrelated organism, crossing species barriers. The impacts are totally unpredictable. It were these unpredictable consequences that led the founding fathers of genetic engineering, or recombinant DNA research, to call for a moratorium on genetic engineering at Asilomer, California, in 1972.

However, Wall Street and the biotechnology industry hijacked genetic engineering and started to rush genetically-modified (GM) crops with false promises to the market".

Then there is the big issue, if you and I who will now eat this vegetable can 'trust' the research, which has largely been conducted by the company, which stands to gain the most if the go-ahead is given.

Currently, we know that all research is funded by companies and then presented to the regulators for clearance. It is not surprising then that there is an enormous lack of credibility - people do not believe what they say has been done. And given the horrific and scandalous track record of private research misguiding policy in the case of drugs or food, why should this be surprising?

It is clear that we need a new system: research must be publicly funded and openly scrutinized. The money must come from companies, but in the form of a cess collected into a fund.

My third reason for rejecting Bt-brinjal is more basic and fundamental. The fact is that I want the right to decide if I want to eat Bt-brinjal or not. But the country has no labeling system to distinguish the GM-hybrid from its more-ordinary cousin. You and I will have no choice.

This is further complicated because labeling demands that the country must have a laboratory network and a functioning regulatory system, so that GM-content can be analyzed and told to consumers.

This is far from the set up we have in the country. We tried to get edible oil checked for GM traces and were turned away by most laboratories in the country, because either they could not test or had such limited facilities that these were expensive and unavailable. So, once again we want the 'modern' technology without the 'modern' facilities to ensure safety and regulation. A deadly combination.

Over and above this there are concerns about what this 'foreign' introduction will do to the biodiversity brinjal in the country - we are the centre of origin of this vegetable, which has over 2500 varieties grown in the country. While the company scientists say that the Bt-brinjal will not contaminate other varieties, research also shows that cross-pollination is definitely possible in this vegetable. Can we take the risk of losing these varieties - long, short, round or twisted - on our table?

To me the outcome is clear: Bt-brinjal is not worth the risk and uncertainty it presents. This is not a verdict on GM crops. It is a verdict on a vegetable that we want our choice to eat or not to eat. The Minister's decision must be supported.

Sunita Narain, director of CSE and editor of Down To Earth

<http://www.cseindia.org/content/bt-brinjal-why-we-should-not-make-a-mash-it>

GM and Civil Society

Two stunning victories for civil society

Two events in recent times argue for a different idea of public space. One is the debate on Bt brinjal and the other is the encounter between Shah Rukh Khan and Shiv Sena. These are two very different debates, but their manner of resolution offers a new hope for civics.

Consider Bt brinjal. Unlike the debate on Bt cotton, this was more systematic

and open-ended. A series of public hearings were announced and superbly conducted. Civil society groups had their own juries, but minister for environment and forests Jairam Ramesh listened quietly. He also wrote to many distinguished scientists, listened to the views of private companies.

There were protests, but they were seen as a legitimate attempt to emphasize voice. A serious issue was

taken seriously and the competence that civil society showed in generating expertise and experience was impressive.

The decision, while provisionally correct, falls within a deeper matrix of complexity. Ramesh tries to present the possibility of rational, unpressured politics. This pre-supposes full knowledge and stakeholders who are more or less equal. We are facing a variety of debates here. It is not

only the opposition of public and private research. The other set of questions is whether we need Bt brinjal within a diversity zone like India? Should Indians allow Bt brinjal into the food chain?

One is not convinced that public control by itself solves the problem. It might merely set up a framework of transparency. These decisions about Bt food are evolutionarily irreversible. We are operating in risk cultures where knowledge can never be certain or predictable. What if there is a future contamination? Are we right in playing dice with evolution? We need new notions of responsibility, prudence, propriety, community beyond the public-private divide. To uphold the tradition of public sector agriculture which heralded the green revolution is not enough.

by Shiv Visvanathan, Feb 14, 2010, <http://timesofindia.indiatimes.com/home/sunday-toi/all-that-matters/Two-stunning-victories-for-civil-society/articleshow/5570655.cms>



Off to Jail!

If the Ministry of Science and Technology has its way, criticising genetically-modified (GM) products could land you in jail.

An Indian citizen who questions the safety of any GM food or medicine could be put behind bars for a minimum period of six months under a new law proposed by the ministry.

The clause to silence critics of GM food is contained in the Biotechnology Regulatory Authority of India (BRAI) Bill, 2009 prepared by the Department of Biotechnology, which is a wing of the ministry of science and technology headed by Prithviraj Chavan.

'Misleading public about organism and products' is one of the crimes for which punishment has been prescribed in Section 63, Chapter 13 of the Bill which deals with various 'offences and penalties'.

The clause specifically deals with critics of biotech products including GM food crops.

It reads, "Whoever, without any evidence or scientific record misleads the public about the safety of the organisms and products specified in Part I or Part II or Part III of the Schedule I, shall be punished with imprisonment for a term which shall not be less than six months but which may extend to one year and with fine which may extend to two lakh rupees or with both."

The Bill has another provision to punish anyone who "without reasonable excuse, resists, obstructs, or attempts to obstruct, impersonate, threaten, intimidate or assault an officer of the Authority or any person assigned to discharge any function under this Act, or in exercising his functions under this Act" with a jail term of three months and a fine of up to Rs 5 lakh. In short, this clause seeks to punish anyone holding a demonstration

or rally near the BRAI or where any official of the authority is visiting.

"It is definitely meant to scare people so that they don't say anything against GM technology. Even journalists writing critical articles can be punished." The Bill has been criticised by several civil society activists. "If this law was in force today, environment minister Jairam Ramesh, who has questioned the safety of GM crops, would have been behind bars because he would have violated it," said Devinder Sharma of the Forum for Biotechnology and Food Security.

Curiously, while every little term in the proposed law such as a "company" or a "director" has been defined, no explanation or definition has been given for terms used in section 63 such as "evidence", "scientific record" and "misleading".

Govt moots jail for GM food critics, by Dinesh C Sharma, India Today, February 19, 2010, <http://indiatoday.intoday.in>