

AGRICULTURE The National Agriculture Magazine

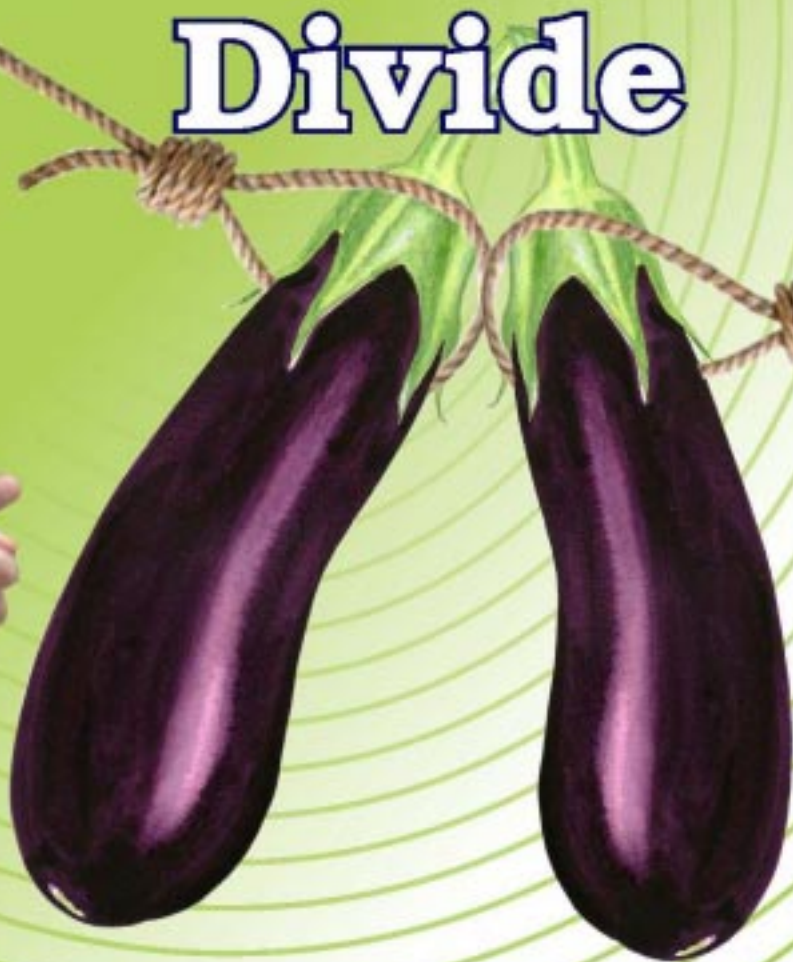
TODAY

April 2010, Rs. 45/-

The Great

BT BRINJAL

Divide



BT BRINJAL IN INDIA: SILENCED SCIENCE

In India, brinjal is grown on about 5.5 million hectares by about 1.5 million farmers who are unorganized and without the political clout of the cotton farmer.

Potato, tomato and onion are more fancied as vegetables than the mundane brinjal which is a butt of many jokes in all the Indian languages. With other vegetables being cheaper and more abundantly available, brinjal engages the fancy of only a few. Yet, brinjal has gained an unprecedented and highly disproportionate attention today, not just in India, but in the world as well, because of one introduced gene intended to control two most damaging worms. The diversity, intensity and depth of politics behind the massive campaign against the new technology, rooted in vested interest, have hijacked even the otherwise balanced Minister for Environment and Forests (MoEF). Neither the brinjal farmers nor the reticent scientific community have found their voice heard.

Brinjal suffers from two insect pests, *Leucinodes orbonalis* and *Helicoverpa armigera* that cause severe shoot and fruit damage. The two pests start from the nursery and are carried to the next crop. No brinjal variety is resistant to these pests. All earlier efforts to contain annual yield losses of marketable brinjal fruit, between 50 and 70 per cent, have failed. The prevalent practice of very high application of synthetic pesticides does not help because the pests are deep inside the stem and fruit tissues.

Bt brinjal contains the Cry1Ac gene which imparts an inbuilt systemic tolerance to the shoot and fruit borers. The



gene was taken from the universally occurring soil bacterium *Bacillus thuringiensis* and incorporated into the genome of brinjal, just as was done in such crops as cotton, corn, potato, tomato and rice, which are being cultivated in over 25 countries for about 14 years without any known adverse effects. *Bt* crops help in greatly reducing the cultivation expenses on the use of synthetic pesticides, and the risk from synthetic chemicals to the farmers, consumers and the environment. *Bt* technology vastly enhances the marketable yield of healthy produce, by controlling the most damaging pest targeted in each case.

The safety and efficacy of *Bt* technology in crops were investigated for a quarter of a century, demonstrated repeatedly by the mandatory regulatory regimes of every one of the 25 countries that commercialized these crops for over 14 years and by 350 million Americans who have been consuming *Bt* foods for over 13 years.

Bt brinjal has been in development in India since 2002. It was subjected to extensive agronomic and biosecurity evaluation as per the mandatory provisions of the Indian Regulatory regime, during 2000-09, involving about 200 scientists and experts from over 15 public and private sector institutions. The test process and results passed through several competent authorities and were also evaluated by two different Expert Committees. The massive dossier on *Bt* brinjal's biosecurity evaluation was placed in the public domain on the website of the Genetic Engineering Approval Committee (GEAC), a statutory body mandated with commercial release of genetically engineered (GE) products. Based on the recommendation of the second Expert Committee which stated that '*Bt* brinjal with event EE-1 (Cry 1Ac) has been extensively tested for its biosafety and no additional studies/review are necessary', the GEAC approved *Bt* brinjal for commercialization, on October 14, 2009, but left the final decision to the Government (meaning MoEF). The MoEF, who was under pressure from anti-tech activists opted for further

consultation with stakeholders, most of who have been for almost a decade campaigning against not just *Bt* brinjal, but all GE crops in India. The MoEF conducted consultation



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meetings at seven centres. The scientific and pro-tech opinion was drowned in the conundrum and din raised by the well organized anti-tech activists.

On February 9, 2010, the MoEF has imposed a moratorium for an unspecified duration on the commercial release of *Bt* brinjal, and he instantly became the darling of the activist groups the world over. Though the public consultation process preceded the MoEF's decision, the decision it self appears to have been taken long before the charade.

The casualty of MoEF's political expediency is proven science and technology behind *Bt* brinjal. This and the overriding of GEAC's opinion did not go well with the Prime Minister's Economic Advisory Council, and the Union Ministers for Agriculture, Science and Technology and Human Resources and several science administrators who openly expressed their disagreement with the MoEF. The PM stepped in to have a meeting with of the concerned Ministers for a joint decision, which certainly raised hopes of supporters of *Bt* brinjal. However, the press release of February 24, 2010, on the outcome of the meeting has proved it to be a damp squib, though many die hard optimists are reading too much into this. Unless some more decisions were taken at the meeting but were not made public, only the following is the substance of the meeting:

- a) The PM has reemphasized the Government's position on the importance of biotechnology in productivity and food security, private

investment in biotech and a time-frame for a decision on Bt brinjal. Nothing new here.

- b) The PM had also emphasized that we must ensure that it (*Bt* brinjal) has no adverse effects on human and animal health and bio-diversity. This implies that the PM agrees with the MoEF's concrete belief that this was not done.
- c) The PM's assured on a speedy setting up of the National Biotechnology Regulatory Authority. This has no consequence to the current fix of *Bt* brinjal.
- d) A time-frame for a decision on Bt brinjal should have been taken at this meeting but the issue was only mentioned. Notwithstanding, the media speculated variedly that the Bt brinjal moratorium is for six months or two years or three years, for which there is no basis either in MoEF's moratorium document or the PM's meeting report. Who has to set the time frame now, the MoEF or the GEAC itself?

The GEAC's position is now marginally better than on February 9, 2010, when the MoEF announced the moratorium, as the PM is reported to have opined that the GEAC will address all concerns and resolves

all scientific issues relating to Bt brinjal, while MoEF's directive had tied the GEAC hands and feet with a long rope on what they should do and how they should do it.

Notwithstanding the riders, the ball is now in the GEAC's court. Three issues are important,

- a) what the GEAC is supposed to do now? b) what is the time frame for doing it? and
- c) who will authenticate the approval of Bt brinjal for commercialization if the GEAC reiterates its earlier stand and recommends for it? There are no easier options in any of these issues.

The scientific community, product developers and governmental agencies such as the GEAC and the Department of Biotechnology, have neglected the

all important issue of educating the public on the safety benefits of the *Bt* technology, which are there for all to see from the India's *Bt* cotton experience of over seven years. This oversight resulted in the activists hijacking the issue, with the help of the media, to promote what is largely MNC phobia and anti-Americanism, in the pursuit of European Union's agenda of promoting the organic lobby, which sees GE technology as a threat. The activist campaign against *Bt* brinjal alleged that a) the products are toxic and allergenic, b) they harm non-target organisms, c) gene flow from *Bt* brinjal eliminates related varieties/species, d) they become super weeds and eliminate all vegetation, e) they negatively impact ecology and biodiversity, f) there is a terminator gene in GE crops affecting the farmers' interests, etc. The activists



made an emotional argument that India is the country of origin of brinjal, and *Bt* brinjal would eliminate the native varieties. Extensive peer reviewed scientific literature amply demonstrates that there is no truth in any of these charges and allegations. *Bt* brinjal is neither toxic nor allergenic and is safe to the non-target organisms and the environment. The floral structure and reproductive behavior of brinjal, which GE technology does not change, do not pose any threats of gene flow.

Notwithstanding the overwhelming scientific evidence and the rigorous approval process, the MoEF imposed a moratorium. The MoEF stated that the moratorium period should be used for further testing of safety of *Bt* brinjal. It is inconceivable that the GEAC, which

opined earlier that no further tests are necessary, has to suggest new tests to be conducted. MoEF's assurance that the moratorium applies only to *Bt* brinjal and not other GE crops in development, finds no takers since the activists who have now tasted blood would not rest till a total ban is imposed on the development of all GE crops in the country. The Indian *Bt* brinjal constitutes a welcome private-public partnership. Mahyco, a private company that obtained rights to the use of the Cry 1Ac gene, is collaborating with two public sector institutions, the Tamil Nadu Agricultural University, Coimbatore and the University of Agricultural Sciences, Dharwad, Karnataka. A similar arrangement is extended to the Indian Institute of Vegetable Research, Varanasi, University of Philippines, Los Banos, Bangladesh Agricultural Research Institute and a private seed company, East West Seeds, Bangladesh. The transfer of technology from the private to the public sector was effected through the Agricultural Biotechnology Support Project II, funded by the USAID and managed by the Cornell University.

The stand taken by the MoEF creates lots of regulatory uncertainty for no valid scientific reason or environmental concern. No technology developer can

afford to operate in the country to develop any biotech crop with such an uncertain approval process that is divorced from science. Delay in the commercialization of *Bt* brinjal will promote its clandestine cultivation as it has happened with *Bt* cotton in Gujarat, and elsewhere. Worse, a GE crop may be released without undergoing any regulatory process, provided it is not said so. This is not in the best interests of the country. A country's science policy should be framed by its scientific fraternity and managed jointly by the relevant scientific institutions and the appropriate departments and statutory bodies of the Government. This important and knowledge based activity cannot be left to the whims of the politicians and/or the man in the street.