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Debate on GM food crops

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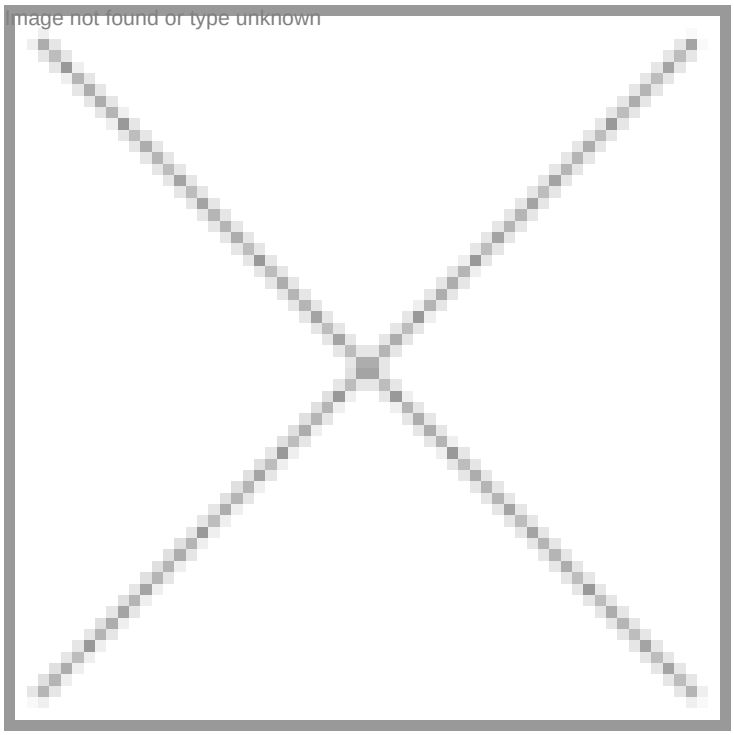

Debate on GM food crops

Dr Anbumani Ramadoss has been dubbed as controversy's favorite child ever since he was anointed as the union ministerof health and family welfare of India, be it the sacking of AIIMS director Dr Venugopal for reasons obscure and illogical, or the banning of tobacco on screen, which did not go well with the film fraternity. Now Dr Anbumani Ramadoss has captivated media attention again for the wrong reasons. In a recent summit held in New Delhi, the health minister has made an outright statement voicing his dissent and disapproval for the introduction of genetically modified (GM) food crops in India, until proper research has been conducted on them.

Anti-GM activists have lauded the health minister's move. Their main contention is that the transgenic food crops could lead to drastic health hazards in India, they also urged the government to freeze the commercialization of Bt food crops. The health minister asserted, "All GM food must undergo tests in Indian conditions before they are allowed into Indian markets. The Bt brinjal has not been tested in India. I am writing both to the Prime Minister and the agricultural minister about this."

The bioagri companies have slammeda this statement as yet another publicity stunt by the health minister. As the country's leading biotech magazine, BioSpectrum, in this special cover story, has tried to bring out all the shades of opinion and available scientific evidence to start an informed debate.

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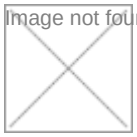
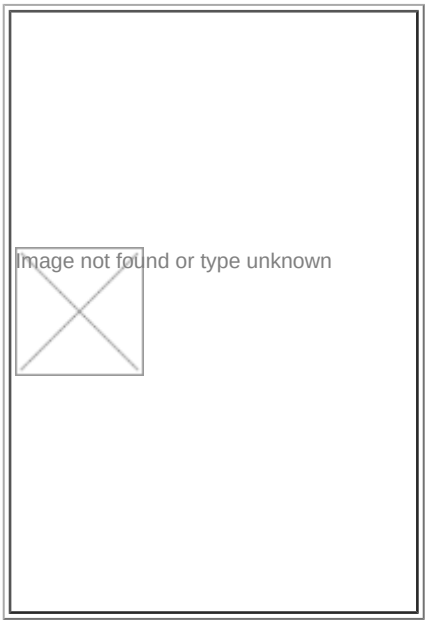


No scientific evidence to prove Dr Ramadoss' contention



In the wake of the controversial statement, industry leaders have unanimously voiced out that Dr Anbumani Ramadoss has made the statement without any scientific backing and is hell bent on slowing down the technological progress of the industry. “It is nothing but an attempt to get political mileage,” commented an industry expert who does not wished to be named.

“Research for GM food crops like Bt brinjal has been going on for six years. The process of checking the biosafety of the crop is exhaustive and intensive. As far as quality issues are concerned the Department of Biotechnology (DBT) is very stringent in giving approval for the products that come out into the market,” commented Nandkishore Kagliwal, CEO, Nath Biogene, Aurangabad.

India is one of the six leading countries that are conducting field trials of GM crops. Besides brinjal, there are over two dozen varieties of rice and an equal number of tomatoes, potato, sugarcane, soy and okra awaiting approval. GM crops like soybean, maize and corn have already been introduced in countries like Australia, Brazil, Canada and US; even after eight years of its introduction there is no opposition or health hazards which are observed.

Moreover the transgenic or the residue of the Bt protein within the food crop is so low, that it can in no way lead to anydrastic health hazards altogether. “For one kilogram of a Bt food crop, the protein incorporated is just one milligram. So the whole issue of high toxicity and health hazards to humans is redundant,” opined

Dr Govind Garg, head, R&D, Krishidhan Seeds.

“I do not see why the health minister has to pass such a statement since it is not his department. Even the food and agriculture department has not passed any judgment and they have also given their approval. I have full faith in the regulatory authority of India and they will consider all the aspects and will not take any hasty decision,” added Dr Govind Garg.

Suresh Agarwal, MD, Bejo Sheetal seeds, Jalna, said: “DBT has introduced some rigorous clauses. Before introduction tothe market, the Bt brinjal is fed to animals, they are checked in a period of 90 days for any effect. The crops are tested in 60 locations in India. The entire spectrum of trials and tests comes up to approximately to around Rs two crores for a period of five years. So taking all this into consideration, I do not think that Dr Ramadoss’ statement has any meaning.”

The ripple effects of the Bt cotton revolution are still being felt in India and industry analysts predict that GM food crops will give birth to a similar revolutionary change in Indian agriculture “Dr Ramadoss along with anti-GM activists is doing nothing but closing doors to a technology which can actually change the face of the industry. In states like Maharashtra and Madhya Pradesh, around 30 percent of direct oil consumption is from cotton seeds for the past three years. There have been no side effects reported.” said Suresh Agarwal.

The triggering factor for Dr Ramadoss’ move was the rumors of animals like goats and cows dying when fed with Bt brinjal. This again is a sheer case of misinterpretation claims industry experts. “Ramadoss claims that the gene in brinjal caused bacterial damage in the intestine when tested on animals. However this is not the case, because it was clinically proven that the harm was not because of the gene but due to some other factors. Research for Bt food crops has been going on for such a long time and no damages have been reported till date. Such technical and scientific statements should not be made until and unless it is proven,” opined MG Shembekar, managing director, Ankur Seeds, Nagpur.

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Why does India need GM crops

With the thumping success of Bt cotton, which was introduced five years ago, the bioagri community is confident that Bt brinjal will follow the same path. When Bt cotton was introduced, production of cotton immediately jumped from approximately 160 million bales in 2003 to approximately 310 million bales in 2008. This would not be the case of non-Bt cotton. Since Bt is resistant to insect attack, the wastage of food crops will get reduced and production is expected to increase four-fold.

In the case of Bt brinjal, farmers would make an additional income of around Rs 15,000 crore (that is another $3 billion) and they would be saving Rs 5,000 crore of pesticides. Moreover in a non-Bt food crop, it has been observed that pesticides need to be sprayed around 20 times to prevent the attack of insects thereby leading to detrimental effects on the environment and above all lead to health hazards to humans.

“Due to its huge population, a country like India needs increased food production to cater to the raising demand. If India becomes pro-Bt, then we will not just have increased yield and income but there will be a reduction in unnecessary wastage of crops, the product becomes marketable, there will be economic benefits to the farmer and the socio-economic gaps in the Indian populace will decrease. After visiting several villages and understanding the adverse effects of chemical pesticides in farmers, I am sure GM crops are inevitable,” Dr Govind Garg added.

Introduction of Bt brinjal will automatically be an encouraging sign for other Bt crops like Bt okra and Bt tomato. “Our country needs it more than any other country. We need better quality and quantity production of food,” pointed out Suresh Agarwal

Unlike the EU and the more advanced nations in the world where the production of non-GM food crops has touched an all time high and population is low, in India GM food crops is more of a need than just a luxury crop. According to the International Service for the Acquisition of Agri-biotech Applications (ISAAA) report ‘Brinjal is grown on nearly 550,000 hectares in India, making the country the second largest producer after China with a 26 percent world production share. It is an important cash crop for more than 1.4 million small, marginal and resource-poor farmers. Brinjal, being a hardy crop that yields well even under drought conditions, is grown in almost all parts of the country. Major brinjal producing states are West Bengal (30 percent production share), Orissa (20 percent), and Gujarat and Bihar (around 10 percent each). In 2005-06, the national average productivity of brinjal was recorded around 15.6 tons per hectare. Despite its popularity in India, brinjal cultivation is often input intensive, especially for insecticide applications. Brinjal is prone to attack from insects, pests and diseases, the most serious and destructive of which is the fruit and shoot borer (FSB) Leucinodes orbonalis. FSB feeds predominantly on brinjal and is prevalent in all brinjal producing states.’ Loses of up to 70 percent for the farmer has been reported due to this problem. On the other hand, a Bt Brinjal crop will bring a full-stop to such problems and resist FSB attack and hence lead to economic gains for the farmer.

In a recent conference in Delhi presided over by Sharad Pawar, the union minister of agriculture, two months ago, there was an unanimous opinion that GM food crops are inevitable in India. “It was a new technology, which would boost the industry, make it insecticide free and all research is going in that direction. At this point of time industries need government support. Government should have a discussion with all the stakeholders to understand their needs and demands. That will allow us to stand in competition with countries like the US and China. China has a lot of on going work in GM food crops whereas India is somewhat lagging behind. The problem in India is that despite the number of research laboratories and talent, unfortunately there is no positive work happening because of lack of incentives. In China, the government plays a proactive role. The Government of India should encourage public-private partnerships,” opined Shembekar.

If Dr Ramadoss has his way, it will be a loss not just to the industry, Indian farmers will get adversely affected. “Bt cotton was a huge success among farmers. The Bt concept was accepted widely by farmers and the GM food crops will receive the same acceptability. Research should fulfill the needs of the farmers and not the needs of politicians,” revealed Shembekar. “It has been accepted among farmers all across the country that the health minister can only delay the process but not stop the technology from being introduced,” said Suresh Agarwal.

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Current work

A lot of Indian companies are already ready to either introduce new GM food crops or are planning to venture into the GM food crop production. While Mahyco will be the first company which will bring out India’s first Bt brinjal with the technology licensed by Monsanto. Nath Biogene is in the process of getting an approval for its Bt brinjal and within another three years it will introduce it into the market after which they will introduce Bt rice. Jalna-based Bejo Sheetal seeds had started research on Bt brinjal three years ago, and within two years it will launch its product into the market; Bt brinjal will be followed by Bt okra, Bt tomato and Bt cauliflower. Looking at the multi-facet benefits, Nagpur-based Ankur Seeds is also planning to focus on Bt brinjal and other GM food crops.

Bt brinjal was first developed by the Maharashtra Hybrid Seeds Company (Mahyco). The company used a DNA construct containing the cry1Ac gene, a CaMV 35S promoter and the selectable marker genes nptII and aad, to transform young cotyledons of brinjal plants. A single copy elite event, named EE-1, was selected and introduced into hybrid brinjal in Mahyco's breeding program. Mahyco also donated the Bt Brinjal technology to the Tamil Nadu Agricultural University (TNAU), Coimbatore and University of Agricultural Sciences (UAS), Dharwad. The event EE-1 was back-crossed into open-pollinated brinjal varieties. Mahyco also donated the technology to public research institutions in the Philippines and Bangladesh. Several other research institutions, both public and private have also been developing Bt brinjal using different genes. Several other research institutions, both public and private have also been developing Bt brinjal using different genes. The National Center on Plant Biotechnology (NRCPB) has developed Bt brinjal varieties expressing the cryFa1 gene. The technology was subsequently transferred to companies including Bejo Sheetal, Vibha Seeds, Nath Seeds and Krishidhan Seeds. The Indian Institute of Horticultural Research (IIHR) is also developing Bt brinjal using the cry1Ab gene. Scientists are also looking for ways to develop Bt brinjal in conjunction with other multiple and beneficial traits.

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Safety concerns of GM foods

While GM foods have been branded as Frankenstein foods by their opponents citing that the products are unnatural, potentially harmful to humans and are capable of harming the environment, the arguments in favour of the same aren't less as well. A study conducted by Lucy Carter at the University of Queensland Australia has founded that there was no evidence to justify continuing moratoriums on commercial GM planting so long as thorough risk assessments were done. The study found the benefits of GM plants and food outweighed the risks, finding no compelling evidence of harm to humans and environment.

Lauding the benefits that biotechnology has to offer Dr KK Tripathi, advisor DBT, said, "Genetic engineering has given us many benefits including decrease in pesticide use, increase in shelf life and increase in productivity. As far as the introduction of GM foods in India is concerned, all developing nations are looking towards India." He refers to Bt brinjal, that is soon to be relased in India after relevant testst have been conducted. "It is the first product of its kind in the world. The benefit of the technology used for Bt brinjal is that there is 90 percent reduction in the pesticide use and 20 percent increase in productivity. Farmers have been asking us as to when will the seed be available to them," Dr Tripathi added.

Dr Vibha Dhawan, executive director, Advanced Biotechnology, TERI, also exudes the same confidence. She said," This isa wonderful technology wherein we are trying to mitigate the problem of insect attack, not by using chemicals but by modifying the crop which is not toxic to human beings, which are targeted only at the insects. In a tropical country like India, the temperature is conducive for microbes and insects and that is one of the reasons that our post-harvest losses are very high and a lot of pesticide has to be sprayed to protect the plants. The introduction of Bt brinjal will reduce the risk associated with pesticide residue, which is very high in a crop like brinjal."

Biosafety is the biggest concern that activists and GM opponents raise when it comes to the release of GM crops. Dr Tripathi feels that we need to look at it with a fresh perspective. " The issue of safety in case of genetic engineering comes up just because we have changed the genetic structure at the particular place with a particular trait. We have broken the species barrier, so we know that there may be something unintended and hence biosafety tests are conducted. While in hybrids(genetic modification), we change a whole lot of traits, some of which we don't know about. So safety issues are relevant in both the cases," he said.

RK Sinha, executive director, All India Crop Biotechnology Association, advised that with a regulatory set up in place all the worries will be eliminated. "Trials and tests are important and they are being done rigorously by the companies under the supervision of GEAC. It is only after biosafety is proved beyond doubt in regard to health of human being, animals and environment that GEAC gives permission to commercialise a product. The same process is followed in the case of Bt brinjal." Talking about the farmers experience with Bt cotton he says, "As far as Bt cotton is concerned , the experience of the farmers is overwhelming. It is giving them returns in terms of productivity, yield etc. As far as food safety is concerned, GM food has been there for more than a decade the world over. No adverse effect has ever been reported. If it is safe for the outside world, it should be safe for India as well."

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Nayantara Som with Jahanara Parveen and Shalini Gupta