香港上環干諾道西二十一至二十四號
海景商業大廈三樓
3/F, Seaview Commercial Building,
21-24 Connaught Road West,
Sheung Wan, Hong Kong.
電話 T: (852) 2854 8300
傳真 F: (852) 2745 2435
www.greenpeace.org.hk
香港 · 廣州 · 北京

Genetically engineered rice: Illegal and unwanted in China

Illegal GE rice found in China

As of June 2005, no varieties of genetically engineered (GE) rice have been approved in China. However Greenpeace has discovered that GE rice seeds have been sold and grown commercially for a number of years. The GE rice is illegal, and has not been approved as safe for either human consumption or the environment. It has entered the Chinese food chain and environment, and may have contaminated Chinese rice exports.

In 13 April 2005, Greenpeace exposed that GE rice has been sold and grown in Hubei for more than two years. Testing by an independent PCR laboratory has confirmed the presence of transgenic DNA in 19 samples. 18 of the samples were tested positive as Bt rice – which has been genetically engineered to produce an inbuilt pesticide. For years, large scale field trials with Bt rice have been conducted by scientists of the Huazhong Agriculture University in Wuhan, the provincial capital of Hubei.[1]

Chinese officials announced that they would conduct an investigation into the scandal but it appears that no action has yet been taken. In June, Greenpeace uncovered that illegal GE rice from Hubei has contaminated rice in Guangzhou, the largest city in Southern China. 21 samples of rice produced in Hubei were collected from rice wholesalers in Guangzhou, and two of them were found by GeneScan to be GE rice. One of the samples was tested positive as Bt rice.

Greenpeace has also collected 9 more seed samples from Hubei province. All of them were found to be GE rice seeds and 8 samples were tested positive as Bt rice. The new research by Greenpeace has also revealed conclusive evidence of the source of the contamination. Two GE rice seed samples were advertised as a product of New Technology Company of Huazhong Agriculture University, a company owned by the University.

Greenpeace estimates that up to 29 tons of GE rice seeds have been sold in Hubei this year, and if no recall action is taken, the seeds could produce up to 14,500 tons of GE rice when harvested.

The Risks

GE insect resistant Bt rice has not been approved for cultivation anywhere in the world. There is no publicly available environmental assessment nor human food safety assessment available for any GE Bt rice.

[1] Tu, J., et. al 2000. Field performance of transgenic elite commercial hybrid rice expressing *Bacillus thuringiensis* ä-endotoxin. Nature Biotechnology 18: 1101-1104.

However, studies from other GE Bt crops such as maize (corn) and cotton give strong indications that Bt rice will have serious environmental consequences and there are serious human food safety concerns.

Food safety risks:

- Rice is the most important staple food crop in the world. On average, rice provides 30% of calorie and 19% of protein intake in China;
- One of the toxins produced in Bt rice (and which was found in two of the samples) could cause allergenic reactions in humans. It has recently been shown that this Cry1Ac protein[2] may have induced allergenic-type responses in mice[3];

Environmental risks:

- Non-target species such as butterflies and moths may be adversely affected;
- The emergence of more troublesome weeds;
- Insects resistant to the introduced toxin may evolve and require more intensive chemical control;
- Contamination of natural genetic resources;
- Bt rice could also affect long-term soil health.

Economic and Market risks:

As China is one of the world's largest exporters of rice, it is expected that the contamination scandal may have significant trade and market impacts, particularly in countries like Japan and Korea where consumer rejection of GE foods is very high.

In 2003/04, China exported rice to the following countries: Japan, Korea, Russia, Germany, UK, Slovakia, Poland, Czech Republic, Belgium, Italy, France, Netherlands, Sweden, Finland, Austria, Cote d'Ivoire, Liberia, Hong Kong and Indonesia.

A similar GE contamination case in the USA in 2001 resulted in a $1 billion product recall amid concerns of potential allergenic reactions after illegal, GE corn (Starlink) entered the food chain. Although StarLink was grown on less than one percent of all US corn fields, it was co-mingled with much larger quantities of corn.[4] It resulted in the recall of nearly 300 contaminated food products[5] in the USA, and it was also found in US maize export markets such as Japan. US government officials estimated that it might take four years to get StarLink out of the US food and seed supply. Three years after the scandal, approximately 1% of samples sent to USDA testing labs are still found to contain StarLink.[6]

No country in the world has commercially released GE rice. The USA is the only country in the world that has approved GE rice, however despite its approval there, no commercial GE rice crops have been planted due to fears of consumer and market rejection.

In China, consumer concern over GE foods is rising. In an opinion poll released by Greenpeace in March, a majority (57%) of the respondents said they would choose non-GE food over GE food, a big leap from 40% in 2004. The poll showed that Chinese consumers were even more cautious when faced with GE rice. According to the survey, 73% of the respondents said they would choose non-GE rice.

Conclusions and Recommendations

The illegal GE rice scandal comes at a time when the Chinese government is considering the commercial release of a number of different varieties of GE rice. If any of these varieties are approved, it will be the first time that the world's most important staple food has been genetically engineered.

The illegal release of GE rice into the food chain prior to any approvals being granted shows the weakness

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[2] The GE Bt rice illegally contaminating Chinese rice market contains a Cry1AC gene or part of a Cry1Ac gene

[3] Moreno-Fierros, L., García, N., Gutiérrez, R., López-Revilla, R. & Vázquez-Padrón, R.I.2000. Intranasal, rectal and intraperitoneal immunization with protoxin Cry1Ac from *Bacillus thuringiensis* induces compartmentalized serum, intestinal, vaginal and pulmonary immune responses in Balb/c mice. Microbes and Infectection 2: 885-890 and references therein.

[4] USDA doesn't know how StarLink tainted 1998 corn. Reuters News Service November 23, 2000

[5] FDA Enforcement Report 00-44 1 November 2000 at http://www.fda.gov/bbs/topics/ENFORCE/ENF00666.html as of December 5, 2000

[6] Jacobs, P. 2003. *Traces of contaminated grain still showing up in corn supply*. 30 November. San Jose Mercury News.

of the regulatory system and highlights the urgent need to strengthen regulation of GE crops and field trials in China.

The Chinese government has not granted any of the required safety permits for GE rice. GE rice seed sold in the market is a violation of both the Seed Law and GE regulations, and those involved in manufacturing and selling the seed should be held accountable. The Seed Law requires withdrawal of unapproved seed varieties from the market. The GE regulation requires withdrawal and destruction of GE crops if they pose a threat to public health and the environment. Greenpeace calls on the Chinese government to uphold the law and act accordingly.

It is unacceptable for a small group of rogue scientists to take the world's most important staple food crop into their own hands. China should halt the approval process for GE rice and immediately implement a decontamination plan to withdraw the illegal GE rice from the food chain and environment.

For more information

Sze Pang Cheung, GE Campaigner, Greenpeace China +86 13911460884 (Beijing)
Janet Cotter, Greenpeace International Science Unit, (UK) +44 781 217 4783 (UK)
Natalia Truchi, Media Officer, Greenpeace China, mobile +86 13910098563 (Beijing)

Centres of rice diversity and areas where GE rice was found