Contamination of conventional rice with genetically engineered rice?

Janet Cotter[a] and Arnaud Apoteker[b]
[a]Greenpeace International Science Unit, Innovations Centre 2, Exeter University, Exeter, UK EX4 4RN j.cotter@exeter.ac.uk;
[b]Greenpeace International, Ottho Heldringstraat 5, 1066 AZ Amsterdam, Netherlands arnaud.apoteker@greenpeace.org>

There is no commercially grown genetically engineered (GE) rice anywhere in the world, although field trials are being conducted. Research by Greenpeace and others over the past few years has identified several incidents of contamination, either from these field trials, or even via illegal selling of GE rice. This highlights the risk of contamination from GE rice.

In 2005, Greenpeace sampling (Fig. 1) revealed that GE insect resistant seed, unapproved for human consumption, was being sold and grown illegally in Hubei, China[1]. Subsequently, Greenpeace found processed rice products contaminated with this GE rice in European shops[2] (Fig. 2).

Fig. 1 Greenpeace using ELISA strip tests to detect GE rice, prior to confirmation by PCR analysis.

Fig. 2 Products found to contain illegal and untested genetically engineered rice imported into the EU.

In 2006, traces of unapproved herbicide-tolerant GE rice, LL601, were found in US exports[3] (Fig. 3), prompting Japan to suspend imports of long grain US rice and other countries to ensure that rice shipments are GE free. LL62 and LL604 have also been detected in European rice supplies[4].

As a result, PCR varietal detection methods are now available for 6 separate lines of GE rice, four for herbicide-tolerant rice originating in the USA and two for insect–resistant varieties originating in China[5].

These contamination incidents confirm the implications of GE contamination to global trade. It is estimated that the costs incurred around the world as a result of US GE rice contamination are within the range of $741 million to $1,285 billion[6]. The contamination endangers human health and threatens organic and traditional rice cultivation (Fig. 4).

For most of these incidents, the route of contamination is, as yet, unknown. For example, LL601 had not been the subject of field tests for several years (since 2001) and the developers are completely at a loss to explain the contamination[7].

Fig. 3 US rice and rice products in danger of contamination with experimental GE rice.

Fig. 4 Greenpeace's organic rice art reflecting the traditions and way of life of rice farmers.

These costly incidents raise questions on how, and if, the segregation of GE and conventional rice can be effectively achieved. Greenpeace believes there should be a ban on the commercialisation of GE rice.

GE rice contamination with experimental varieties, e.g. those at the field trial stage, demands that those institutions researching GE rice (e.g. IRRI) need to exercise utmost care to prevent contamination, by growing GE rice only in secure, contained greenhouses and not in open plots.

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[2] http://www.greenpeace.org/raw/content/international/press/reports/IllegalChinaGErice.pdf
[3] Vermij, P. 2006. Liberty Link rice raises specter of tightened regulations. Nature Biotechnology 24:1302
[4] http://www.gmcontaminationregister.org/
[5] http://www.genescan.de/en/special-issue/gmo-rice.aspx
[6] Greenpeace 2007. Risky Business. http://www.greenpeace.org/international/press/reports/risky-business
[7] http://www.bayermaterialsciencenafta.com/news/index.cfm?mode=detail&id=00ba47e2c7002cc599e8f7ceb80143a2