

## **GM Nightmare Unfolds Around A Regulatory Sham**

*Alarming findings of deaths, stunting and sterility in rats fed genetically modified soybeans now tops the long list of evidence on the health hazards of GM food and feed, but our regulators are still dismissing the evidence and helping to promote GM crops*

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### **Damning evidence lining up against the safety of GM food and feed**

Female rats fed genetically modified (GM) soybeans gave birth to many severely stunted pups, with over half of the litter dead by three weeks, and the surviving pups were sterile [1] ([GM Soya Fed Rats: Stunted, Dead, or Sterile](#), *SiS* 33).

These findings from the laboratory of Dr. Irina Ermakove, a senior scientist of the Russian Academy of Sciences, are not an isolated case peculiar to a specific batch of GM soya. They top a long list of evidence that has accumulated from all over the world, indicating that GM food and feed may be inherently hazardous to health (see Box 1).

Like a long string of scientists who have tried to tell the public what they know, Ermakova's funding has been cut, and she is now strongly discouraged from continuing with the research. She is pleading for other scientists to repeat her work to see if they can replicate her results.

#### **Box 1**

##### **Accumulating vidence on the health hazards of GM food and feed**

1. Scientists at the Russian Academy of Sciences reported between 2005 and 2006 that female rats fed glyphosate-tolerant GM soybeans produced excessive numbers of severely stunted pups and more than half of the litter dying within three weeks, while the surviving pups are completely sterile (see main article).
2. Between 2004 and 2005, hundreds of farm workers and cotton handlers in Madhya Pradesh, India, suffered allergy symptoms from exposure to Bt cotton [2] ([More Illnesses Linked to Bt Crops](#), *SiS* 30).
3. Between 2005 and 2006, thousands of sheep died after grazing on Bt cotton crop residues in four villages in the Warangal district of Andhra Pradesh in India [3] ([Mass Deaths in Sheep Grazing on Bt Cotton](#), *SiS* 30).
4. In 2005, scientists at the Commonwealth Scientific and Industrial Research Organization in Canberra Australia reported that a harmless protein in bean (alpha-amylase inhibitor 1) transferred to pea caused inflammation in the lungs of mice and provoked sensitivities to other proteins in the diet [4] ([Transgenic Pea that Made Mice Ill](#), *SiS* 29).
5. From 2002 to 2005, scientists at the Universities of Urbino, Perugia and Pavia in Italy published reports indicating that GM-soya affected cells in the pancreas, liver and testes of young mice [5] ([GM Ban Long Overdue](#), *SiS* 29).
6. In 2003, villagers in the south of the Philippines suffered mysterious illnesses when a Monsanto Bt maize hybrid came into flower; antibodies to the Bt protein were found in the villagers, there have been at least five unexplained deaths and some remain ill to this day [5].
7. In 2004, Monsanto company's secret research dossier showed that rats fed MON863 GM maize developed serious kidney and blood abnormalities [6].
8. Between 2001 and 2002, a dozen cows died in Hesse Germany after eating Syngenta GM maize Bt176, and more in the herd had to be slaughtered from mysterious illnesses [7] ([Cows Ate GM Maize & Died](#), *SiS* 21).
9. In 1998, Dr. Arpad Pusztai and colleagues formerly of the Rowett Institute in Scotland reported damage in every organ system of young rats fed GM potatoes containing snowdrop lectin, including a stomach lining twice as thick as controls [8].
10. Also in 1998, scientists in Egypt found similar effects in the gut of mice fed Bt potato [9].
11. The US Food and Drug Administration had data dating back to early 1990s showing that rats fed GM tomatoes with antisense gene to delay ripening had developed small holes in their stomach [8].
12. In 2002, Aventis company (later Bayer Cropscience) submitted data to UK regulators showing that chickens fed glufosinate-tolerant GM maize Chardon LL were twice as likely to die compared with controls [10] ([Animals Avoid GM Food, for Good Reasons](#), *SiS* 21).

From the evidence listed, one can see that numerous varieties of GM crops - soybean, tomato, maize, cotton, potato, pea - with different transgenes, fed to rats, mice, cows, sheep, chickens, or human beings, resulted in illnesses and deaths. The obvious suspect is the GM process and/or the artificial genetic material used.

### **The regulatory fraud**

The list is not complete. In fact, evidence of GM hazards has been building up since the 1980s that should have halted the development or commercialisation of many, if not all GM crops [2], if the precautionary principle means anything to them. But our regulators were biased in favour of GM from the first, and have systematically ignored and dismissed research findings that might harm the fledgling biotech industry [11] ([Fatal Flaws in Food Safety Assessment: Critique of the Joint FAO ...](#), ISIS Briefing). By now, the evidence has accumulated to such an extent that the regulators should be answering a charge of criminal negligence at the very least in continuing their campaign of denial and misrepresentation while failing to impose a ban on further releases of all GM crops until and unless they have been proven safe by thorough independent investigations [5].

Our regulators are bound by statutory remit to operate on the precautionary principle as stated in the international Cartagena Biosafety Protocol for genetically modified organisms (GMOs); and UK and the European Union have signed up to that.

UK's watchdog, the Food Standards Agency (FSA,) is advised by the Advisory Committee on Novel Foods and Processes (ACNFP), which advertises itself as "a nonstatutory independent body of scientific experts," even though the majority of its members, including the chair, have vested biotech interests as shareholders of companies, paid consultants or recipients of research grants [12].

A search for 'precautionary principle' on the FSA website gave no result. Instead, a document entitled *The Food Standards Agency's Approach to Risk* [13] states: "We will take a precautionary approach – that is, we will not always wait until we have proof of a potential hazard to take action or issue advice. Such action will be taken on the best available evidence to protect public health. It will be reviewed if new evidence becomes available."

In practice both the FSA and the ACNFP have been operating on the *anti*-precautionary principle [14] ([Use and Abuse of the Precautionary Principle](#), ISIS Briefing). Not only do they require the public and genuinely independent scientists to prove there is hazard, they have persistently ignored all evidence of hazards submitted to them, and instead, continue to misinform the public by citing with approval highly flawed studies that claim to find no effect [1].

### **Regulator or promoter?**

The FSA website contains a highly misleading description of genetic modification under "GM food" [15]:

"But whereas traditional methods involve mixing thousands of genes, genetic modification allows just one individual gene, or a small number of genes, to be inserted into a plant, animal or micro-organism (such as bacteria), to change it in a pre-determined way. Through genetic modification, genes can also be 'switched' on or off to change the way a plant or animal develops."

The description implies a level of precision and control in the process of genetic modification that flies in the face of extensive evidence indicating that the very opposite is the case. One can easily mistake the FSA for an agency promoting GM food.

***It is now generally accepted by genetic engineering scientists that the genetic modification process is uncontrollable, unreliable and unpredictable, and far from precise.*** It damages the natural genetic material of the organism, resulting in many unpredictable, unintended effects in the few “successes”, including gross abnormalities that you can see, and metabolic changes that you can’t [16] ([FAQ on Genetic Engineering](#), ISIS Tutorial).

A transgenic line is essentially derived from a single cell that has taken up the foreign genetic material, so its properties will depend on where and in what form in the genome – the totality of the organism’s genetic material - the insert(s) landed, and the collateral damages done to the genome, which will differ from one event to another. That is why European Union regulation requires “event specific” characterization of the transgenic insert(s), which also provides a method for detecting transgenic contamination of GM produce, an increasingly frequent occurrence involving transgenic lines that have not even been approved for commercial release.

And when that happens, as with the recent GM rice contamination, regulators come to the rescue on both sides of the Atlantic. The USDA has proposed to deregulate the illegal rice to make it effectively legal, considering it as safe as a ‘similar’ variety that has been approved [17] ([USDA Poised to Deregulate Illegal GM Rice](#), *SiS* 32). The European Food Standards Agency (EFSA) acting on behalf of the European Union, while admitting that the available data were “not sufficient to allow the safety of LLRICE601 to be assessed”, nevertheless considered that “the consumption of imported long grain rice containing trace levels of LLRICE 601 is not likely to pose an imminent safety concern to humans or animal” [18] ([GM Rice Contamination How Regulators Tried to Sidestep the Law](#)). UK’s FSA and ACNFP were even more obliging. Based on an incomplete dossier supplied by the offending company Bayer CropScience, they consulted two scientists, who also decided there was no “imminent” safety concern (note the qualifier “imminent”). But while the EU had decided to ban US long grain rice, the FSA told retailers in a memo later leaked to the press that there was no need to check whether any of the rice they were selling were tainted; which was against the law. It was only when Friends of the Earth threatened to take the FSA to court that FSA backed down.

## References

1. Ho MW. GM soya fed rats: stunted, dead or sterile. *Science in Society* 33 (in press).
2. Ho MW. More illnesses linked to Bt crops. [Science in Society](#) 30, 8-10, 2006.
3. Ho MW. Mass deaths in sheep grazing on Bt cotton. [Science in Society](#) 30. 12-13, 2006.
4. Ho MW. Transgenic pea that made mice ill. [Science in Society](#) 29, 28-29, 2006.
5. Ho MW. GM ban long overdue. Dozens ill & five deaths in the Philippines. [Science in Society](#) 29, 26-27, 2006.
6. “French experts very disturbed by health effects of Monsanto GM corn” GMWatch, 23 April 2004. [www.gmwatch.org](http://www.gmwatch.org)
7. Ho MW and Burcher S. Cows ate GM maize and died. [Science in Society](#) 21, 4-6, 2004.
8. Pusztai A, Bardocz S and Ewen SWB. Genetically modified foods: Potential human health effects. In *Food Safety: Contaminants and Toxins*, (J P F D’Mello ed.), Scottish Agricultural College, Edinburgh, CAB International, 2003.
9. Fares NH and El-Sayed AK. Fine structural changes in the ileum of mice fed on δendotoxin-treated potatoes and transgenic potatoes. *Natural Toxins*, 1998, 6, 219-33; also “Bt is toxic” by Joe Cummins and Mae-Wan Ho, *ISIS News* 7/8, February

- 2001, ISSN: 1474-1547 (print), ISSN: 1474-1814 (online) <http://www.i-sis.org.uk/isisnews.php> Agricultural Biotechnology 2006, [www.ISAAA.org](http://www.ISAAA.org)
10. Novotny E. Animals avoid GM food, for good reasons. [Science in Society 21](#), 9-11, 2004.
  11. Ho MW and Steinbrecher RA. Fatal flaws in food safety assessment: critique of the joint FAO/WHO Biotechnology and Food Safety Report. *Environmental & Nutritional Interactions* 1998, 2, 51-84.
  12. ACNFP Members' interests June 2006, <http://www.food.gov.uk/multimedia/pdfs/acnfpintjun06.pdf>
  13. The Food Standards Agency's Approach to Risk, Food Standards Agency, <http://www.food.gov.uk/multimedia/pdfs/riskapproach.pdf>
  14. Saunders PT. Use and abuse of the precautionary principle. ISIS submission to US Advisory Committee on International Economic Policy Biotech. Working Group 13 July, 2000, <http://www.i-sis.org.uk/prec.php>
  15. GM food, Food Standards Agency, <http://www.eatwell.gov.uk/healthissues/factsbehindissues/gmfood/>
  16. Ho MW. FAQs on genetic engineering. ISIS tutorial <http://www.i-sis.org.uk/onlinestore/papers2.php#section5>
  17. Cummins J and Ho MW. USDA poised to deregulate illegal GM rice. [Science in Society 32](#), 6-7, 2006.
  18. Saunders PT. GM rice contamination: how regulators tried to sidestep the law. [Science in Society 32](#), 4-5, 2006.