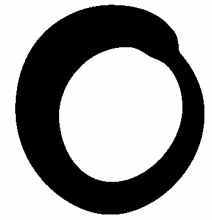


Briefing Note



**Friends of
the Earth**

GM food safety

The safety of genetically modified (GM) foods remains in serious doubt. A senior member of the British Medical Association has called for GM trials to be halted because “we do not have enough reliable scientific evidence on their safety”ⁱ and the head of the Government’s GM food safety committee has admitted that possible hazards of GM foods could have been missedⁱⁱ. This briefing outlines some of the concerns about the safety for human health of GM foods.

What is genetic modification?

For thousands of years farmers and plant breeders have been changing crop plants to improve characteristics such as size, resistance to disease and taste. Plants which grow well, have a higher yield or taste better are selected and bred from. This is still the most widely used technique for developing new varieties of a crop - it is limited by natural barriers which stop different species of organisms from breeding with each other. But genetic modification is very different to these traditional plant breeding techniques. It is a technology which allows scientists to take genes from one organism and put them into another. This changes the characteristics of the organism, or the way it grows and develops.

What are the concerns about GM food?

Transferring DNA and genes from one organism to another is a difficult and fairly haphazard procedure. At present there is no way to control or direct what happens, and so new genes end up being inserted at random into the genetic makeup of the organismⁱⁱⁱ. Inserted genes can sometimes fail to work, or behave in ways that aren’t expected, or the functioning of native genes may be affected.

Scientists have voiced concern that such disruptions could lead to unexpected toxins being produced, or changes in the levels of nutrients and naturally occurring toxins. There are examples of genetic modification changing plants in entirely unexpected ways. For example, when researchers in Germany tried to boost the starch content of potatoes using genes from yeast and bacteria, they found that the starch content actually fell and other, unexpected, compounds were produced^{iv}.

Substantial Equivalence

The safety testing of GM foods is based on the concept of ‘substantial equivalence’. This is the idea that if a GM food can be shown to be ‘substantially’ the same as a non GM food then it is considered to be safe. It was developed because of the difficulties and cost of conducting traditional safety tests (like those used for new drugs) on GM foods. But it has been criticised by some scientists as being open to interpretation.

For example, the biotech company Aventis/Bayer analysed its GM ‘T25’ maize and found significant differences in the amount of fat and carbohydrate compared to non GM maize^v. The levels of two fatty acids in the GM maize were outside the range of values recorded in any other published study for this crop^{vi}. But in spite of this, the company still claimed that the GM maize was “*not materially different*” from non-GM maize^{vii}.

Sound Science?

The safety of GM foods depends on government assessment of tests conducted by the biotech companies themselves. Most of these tests have never been published or peer reviewed. A Spanish researcher who investigated this in 2000 could only find 8 published safety studies on food from different GM crops^{viii}, but there are over forty GM crops approved for sale around the world.

Antibiotics

Many GM crops contain genes which provide resistance to commonly used antibiotics such as ampicillin. There is concern that these could be passed from food to the bacteria in the guts of humans and animals. That concern is supported by a recent experiment that found modified genes were picked up by bacteria in the guts of humans that were fed a meal containing GM soya.

What GM foods are on sale in the UK?

The European Union grants approvals for GM foods to be sold in Europe and the UK. This is done under the Novel Foods Regulation, which came into force in 1997. The Regulation requires a full safety assessment of any GM food, and consideration by all member states, before it can be sold. But two GM foods - Monsanto's 'roundup ready' soya and Novartis's 'Bt176' maize - were already on sale in the EU before the law came into force. These two GM foods did not have to go through the full safety assessment because the law could not be back dated.

In addition, the Novel Foods regulation contains a fast track route for processed GM foods. This fast track route does not require a full safety assessment either. As long as a company can claim that its food is 'substantially equivalent' to non GM foods, then all it has to do is tell the European Commission that it wants to start selling the food in Europe. So far, foods from four types of GM maize and oil from seven types of GM oilseed rape have been approved in this way^{ix}.

Although food from 13 GM crops have been approved for sale in the EU, most supermarkets and food manufacturers in the UK have removed GM ingredients from their produce.

ⁱ "Farmers told GM crops are 'too dangerous to insure'" *Scottish Herald* 10 March 2002

ⁱⁱ Written submission of Professor Janet Bainbridge to the Royal Society, 16 May 2001. *The use of substantial equivalence in the risk assessment of GM food*

ⁱⁱⁱ Maessen, GDF. 1997. Genomic stability and stability of expression in genetically modified plants *Acta Botanica Neerlandica* 46(1) pp 3-24

^{iv} Gura, T. 2000 Reaping the plant gene harvest *Science* 287 412-414

^v Submission for placing on the market (in accordance with the Part C of the Directive 90/220/EEC) of Glufosinate Tolerant Corns (*Zea mays*) Transformation Event T25", submitted by AgrEvo France. Reference C/F/95/12-07. page 43, Figure C 3

^{vi} "Safety, Compositional and nutritional aspects of glufosinate resistant corn transformation events T14 and T25", produced in 1995 by AgrEvo USA page 31

^{vii} Op Cit 5. Page 40

^{viii} Domingo, JL. 2000 "Health risks of GM foods: many opinions but few data" June 9, 2000 *Science* Volume 288, Number 5472, pp. 1748 - 1749

^{ix} Monsanto's Roundup Ready soya and Novartis' Bt 176 maize were marketed prior to the introduction of Regulation 258/97. All other GM foods approved, were notified by manufacturers as laid out in Article 5 of Regulation 258/97. The foods notified must be 'derived from but not containing GMOs' and be substantially equivalent to non GM foods.

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