



Genetic engineering and human health

There are concerns that GMOs could pose a serious health risk. With possible health problems being identified ranging from concerns about antibiotic resistance, the creation of new toxins, and unexpected allergic reactions. The reality is that these concerns remain largely speculative because no one can predict what the outcome of the introduction of GMOs into the food chain will be.

- no adequate safety tests have been carried out
- no-one is monitoring the impact of GMOs into the diets of those countries now selling significant quantities of GM
- far too little is known about genes and DNA to predict what the possible unexpected effects of genetic engineering will be

The Soil Association believes that genetically modified foods should be excluded from all food production because their use goes against the organisation's principles for safe and sustainable food production. This stance has often been described as anti-science, but is in fact supported by scientific evidence which indicates that genetically modified organisms (GMOs) are not sufficiently well understood to be safely introduced into the food chain.

Contrary to the public statements by biotechnology companies that genetic engineering is a precise technique and simply an extension of traditional breeding methods, the process is in fact completely different. The outcome is inherently random in many respects and has been proven to result in unexpected side effects. These issues are explored in more detail below.

How GM food is approved

Governments require GM companies to provide an assessment of the possible impacts of their GM crop on humans and the environment. A new regulatory concept has been created to enable the approval of genetically engineered (GE) products. This is known as the concept of 'substantial equivalence'. It means that GMOs are assumed to be largely the same as the non-genetically engineered equivalent. As a result they do not have to go through a thorough safety testing procedure.

This approach was opposed by many of the scientific advisers to the American government, who said that unpredictable effects of genetic modification would not be identified by these procedures, as they were far too limited. Despite these warnings the concept of 'substantial equivalence' was adopted as the basis for safety testing for GMOs.

Is GM food safe?

Scientists are still a very long way from truly understanding the DNA and genes of living things. As a result it is impossible to tell what the long-term health implications of GM food will be.

Genetic engineering can introduce proteins that humans have never been exposed to before. In addition, the modification process could have caused an increase in the level of existing allergens (a substance that can cause an allergic reaction). For example, one GM soya had 27% more allergens than non-GM soya. Many scientists, including several in the American Government's Food and Drugs Administration have forecast allergic reactions.

Known effects on human health

The only known trial on humans of GM food was carried out by the University of Newcastle in 2002. It was commissioned by the Government's Food Standards Agency. Seven people were given a meal containing GM soya and it was found that in at least three people the GM material moved out of the food and entered their gut bacteria after only one meal. Our gut bacteria perform an important role in digestion and any changes to their characteristics are a cause of concern.

The accidental contamination of many US food products with GM StarLink maize in 2000 is believed to have caused allergic reactions in over 50 Americans, some serious. After a full investigation, the independent advisory committee on the StarLink case advised the US Government that there was a "medium probability" that the maize could cause allergic reactions.

The following developments indicate unidentified negative effects could be occurring:

UK: a 50% rise in soya allergies is reported since imports of GM soya started (York Nutritional Laboratory, reported in the Daily Express, 12.3.99)

Ireland: doctors report a rise in soya allergies in children since the start of GM soya imports. (Dr Elizabeth Cullen, co-chair of the Irish Doctors', The Irish Times 13.3.2001)

US: coinciding with the introduction of GM ingredients, food derived illnesses are believed to have doubled over the last seven years. (New York Times, 18.3.2001)

Negative effects on animals

- Problems have been found among the few independent studies that have been carried out on animals. We are aware of three studies that show negative effects of GM food on animals, yet in some cases the food was still approved to be eaten by humans or animals:
- Flavr Savr tomatoes: resulted in damage (gastritis), in rats' stomachs. On a scale of 1-4, the effects were 2-3, but described by the company as "mild". The tomatoes were approved and sold in America but have now been taken off supermarket shelves. They were also approved in the UK but never marketed.
- GM potatoes: Dr Arpad Pusztai's experiments at the Rowett Institute found damage to the guts of rats following consumption of GM potatoes with the gene for lectin production and widely reported. The rats were unaffected by non-GM potatoes or lectin alone. Another researcher reported similar effects.
- GM forage maize (Chardon LL): twice as many chickens fed the GM protein died as those fed non-GM feed yet the Government approved the maize for commercial growing in the UK (this was before the EU-wide moratorium

on the planting of new GM crops). This research has been widely reported, including by the BBC last year.

Concerns of scientists and other experts

Some respected organisations have voiced concerns. The British Medical Association has warned that there is not enough evidence to state that GMOs are safe. They have stated that the “precautionary principle should be applied in developing genetically modified crops or foodstuffs, as we cannot at present know whether there are any serious risks to the environment or to human health involved in producing GM crops or consuming GM food products. Adverse effects are likely to be irreversible; once GMOs are released into the environment they cannot be subject to control”.

A balanced debate?

While there is some evidence and many reasons to suggest that GM food may have the potential to cause health problems, there is little evidence of specific health problems simply because the research has not been done.

This makes it hard for scientists to raise concerns that may be deemed controversial. Scientists often consider their role as being one in which they only deal with established facts, especially when issues have become controversial. They also have to worry about funding as there is little available for exposing possible risks of GMOs. The few scientists who have exposed problems have been discredited by the biotechnology companies and their supporters.

Genetic engineering introduces many unpredictable hazards into the food chain. The limited level of scientific knowledge means many scientists believe that risk assessment and control measures cannot be reliably designed. At this stage of the technology's development, GM crops could lead to unpredictable and possibly serious impacts on health and the environment.

Considering the evidence, it seems that decisions on the safety of GMOs and necessary control measures are not being made solely on the basis of science, but also on assumptions and industry opinion. The Soil Association believes that the way in which genetic engineering is being introduced into food production is completely unnecessary and unsound.

Further information

The following information sheets on issues relating to genetic engineering in food and farming are also available, for these please see the library section of our website www.soilassociation.org or T: 0117 914 2444.

How can I support the work of the Soil Association?

The Soil Association is a membership charity, we urgently need your support to continue our work. As public support for the Soil Association continues to grow, our ability to influence the thinking and policies of government and big business grows with it. In this way we help to develop a truly healthy and sustainable future. Join us today and help us to continue campaigning for sustainable agriculture and organic food. You can join the Soil Association on our website, over the phone or by writing to us.

Further Reading

Please see the Soil Association website library, <http://www.soilassociation.org/gm>, for more information

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Version057.3 Approved: