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Commentary, part of Special Feature on [Genetically Modified Organisms](#)

GM Foods in the UK between 1996 and 1999: Comments on "Genetically Modified Crops: Risks and Promise" by Gordon Conway

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INTRODUCTION

There are important lessons to learn from the history of genetically modified (GM) foods in the UK over the past three years, many of which echo Gordon Conway's central message (Conway 2000). In 1996, the first GM product, tomato paste made from GM tomatoes with an anti-sense mutation to allow ripening without softening, appeared on UK supermarket shelves. The GM tomato paste, which was slightly cheaper than non-GM paste, was outselling its conventional equivalent in J. Sainsbury plc, one of the leading UK supermarket chains. However, by the second half of 1999, all of the major supermarket chains in the UK had responded to public pressure by withdrawing GM products (not only the tomato paste, but also GM herbicide-tolerant or insect-resistant soya and corn products). Restaurants are now obliged to indicate whether or not their dishes contain GM products, and many have withdrawn GM foods from their menus.

How on earth could such a radical change in the public's response come about within three years? Why was the reaction of the British public to GM foods so different from that in the United States, where GM foods had been widely accepted?

Gordon Conway provides part of the answer: "The rush to get products to market has led to mistakes, misunderstanding, and a backlash against plant biotechnology. ... Had there been a slower introduction of this technology, with more commitment to the Precautionary Principle ..., there would have been far better public acceptance."

WHAT HAPPENED IN THE UK

Three quotes from British broadsheet newspapers capture some of the feeling in mid-1999:

"The issue remains one of the most badly bungled pieces of public policy in recent years." (*The Observer* 23.5.99);

"How do you handle an explosive issue that embraces food safety, the environment, corporate power, little understood science, consumer trust and ethics?" (*The Guardian* 22.5.99);

"Ministers and many scientists are angrily baffled about the country's fear of GM foods. Here is a hugely powerful new science, a job creating potential force for good, and the British are shunning it." (*Observer* 23.5.99).

Let me summarize what I see as the main factors that led to the dramatic change of attitude in the UK. Many forces came into play, at least some of which could have been foreseen and prevented. Others perhaps could not.

1. BSE. The first thing to say is that the UK is living in the aftermath of the Bovine Spongiform Encephalopathy (BSE) crisis, which has fundamentally changed the attitude of most people toward government, industry, and food safety. We do not yet know how many people will die of new variant Creutzfeldt-Jacob Disease (vCJD) contracted from eating BSE-infected cattle; 48 have died so far and current estimates range from a few hundred to a few hundred thousand projected deaths. Most people in the UK assume that the government made mistakes and did not protect consumer interests, in being secretive and in not acting with sufficient vigor in response to early warning signals. Equally, many people assume that industry put profit ahead of consumer safety. The BSE outbreak, with its as-yet-undetermined impact on the human population of the UK, acted like a vaccine, causing the public to develop psychological antibodies to novel foods.

2. Labeling and consumer choice. The tomato paste was labeled as GM, whereas the soya and corn products, because they contained a mix of GM and conventional sources, did not carry clear labels. Consumers distrust secrecy.

3. Consumer benefit. Consumers quite rightly ask "How do I benefit from this new product?" No convincing consumer benefit was perceived for herbicide-tolerant or insect-resistant soya and corn products, in terms of price, quality, taste, or nutritional value. The benefits were seen as accruing to Monsanto (the owners of the Intellectual Property Rights), and perhaps to farmers. Many consumers perceived a potential cost: the possible negative impacts of genetic modification on the environment or on food safety. In contrast, the GM tomato paste did have a consumer benefit, namely, lower price. Consumers are canny at calculating costs and benefits and are not simply averse to new technologies: they want to see a benefit to offset any perceived increase in risk.

If the first GM food product on the market in the UK had been, for example, a potato crisp ("chip" for U.S. readers) that both reduced the likelihood of suffering a heart attack and cost less than the conventional kind, the public reaction might have been different! It is noteworthy that the rejection of GM foods has not been paralleled by a rejection of GM products for medical treatment, such as human insulin or clotting factor IX.

4. Mixing up of environmental and health risks. At about the same time that the unlabeled GM soya and corn products were introduced into UK supermarkets, the commercial growing of GM crops (herbicide-tolerant oilseed rape and sugar beet) was proposed by Monsanto and approved by the government. This introduced a new dimension of concern, the possible environment impacts of GM; this issue became muddled (or was deliberately muddled by anti-GM lobbyists) with the food safety issue. In fact, at least some experts think that the environmental risks (both the specific issue of gene transfer and the more general issue of increasing the proportion of primary productivity that goes into the human food chain) are less well understood than the food safety aspects. In the UK, concern for biodiversity in agricultural environments is high, because nearly 80% of the land surface of the UK is agricultural; there is nowhere else for wild species to hide. This is a difference between a small, densely populated country and a large country with plenty of wilderness, such as the United States.

5. The work of Arpad Puztai and the credibility of scientists. In August 1998, Arpad Puztai, a scientist from the Rowett Research Institute, a highly respected government laboratory in Aberdeen, Scotland, claimed on television that he had shown that a particular form of GM potatoes damaged the health of rats. Several months later, Puztai's results were publicized with renewed fervor by the anti-GM lobby, and his results were understood by some as showing that all "Frankenstein Foods" (the memorable phrase coined by the tabloid press) were unsafe to eat. Puztai's work had not been published or subjected to peer review. Subsequent scrutiny has revealed that it was poorly executed, and it certainly needs to be replicated.

Even if it were demonstrated that Puztai's conclusions were correct, namely, that GM potatoes containing the gene for lectin have detrimental effects on the immune system, metabolism, and organ development of rats, this would not justify a general conclusion that all GM foods are dangerous to human health. May (1999) makes the point with a memorable analogy: "...if I were to mix cyanide with vermouth and I found the resulting cocktail unhealthy, I would be silly to draw the general conclusion that I should never mix drinks."

In fact, it is almost inconceivable that a plant food with lectin genes inserted (given the known toxic effects of lectin) would ever be developed for human consumption. The furor arising from Puztai's work should, however, have given scientists food for thought about how they present themselves to the outside world. In particular, three areas of confusion are noteworthy.

a) Who is a reputable scientist? Puztai worked in a premier government nutrition institute, and what is more, according one newspaper report, "respected scientists" (a list drawn up by Friends of the Earth) from around the world pledged their support for his results. However, the Royal Society of London, Britain's National Academy, scrutinized Puztai's work and concluded that the experiments were flawed in both design and statistical analysis (Royal Society of London 1999). This is confusing: how is the public meant to judge which scientist or group of scientists is reputable, trustworthy, and authoritative? The situation is further muddled when it emerges that the scientists advocating GM foods have conflicts of interest such as biotechnology industry sponsorship for their work, consultancies with GM industries, and a research career that depends on the future success of GM technology. For the general public, this is akin to a scientist sponsored by the tobacco industry telling you that it is safe to smoke after all.

b) Peer review. Many of the critics of Puztai in the scientific community pointed out that his work had not been reviewed by peers before he reported it on television. Peer review was a new concept to the layperson, and when it was explained that is a process in which anonymous individuals make critical or favorable comments on another's work, which they do not have to justify in the open, confidence in science was not increased! To add to the confusion, Puztai's work was eventually published in a peer-reviewed journal (Ewen and Puztai 1999), even after it had been dismissed as unpublishable by the Royal Society of London.

c) The nature of science. To the layperson, the question is: "Is this food safe?" The scientist's reply is: "At the moment, we have no evidence to suggest otherwise." During the middle of the GM food crisis, one of the more insightful broadsheet science journalists wrote an article entitled "They don't know, you know." This is not the way science is normally presented to the wider public: the concept that science does not deal with certainties, but with reductions in uncertainty, is unfamiliar.

In short, the overall image of science that emerged from the GM food crisis was one of contradiction, confusion, secrecy, uncertainty, and conflicts of interest.

6. Lack of understanding of biotechnology. It is no doubt true that many people have no idea of what is

meant by genetic modification. Opinion polls show that a substantial proportion of people think that non-GM foods contain no genes. However, one should not be seduced into thinking that greater understanding leads to greater acceptance. In fact, the Eurobarometer Surveys carried out for the European Commission show that the opposite is true. Across Europe, there is, if anything, a negative correlation between knowledge of scientific fact or process and optimism about the benefits of scientific research for society. This pattern brings to mind the old joke that a pessimist is nothing more than an optimist in possession of the facts.

Current thinking in the UK is moving on from the so-called "deficit model" of public understanding of science: "Just explain a bit more and it will all be OK." The emerging emphasis is on open dialogue and engagement in the debate about the relationship between Science and Society.

7. Hostility to corporate power. For some/many environmental groups and other lobbyists, the real agenda is to oppose globalization and the corporate power of multinational companies to impose their choices on ordinary people (witness the riots in Seattle, Washington, USA at the recent World Trade Organization (WTO) meetings). These groups seized upon GM foods as a convenient and highly emotive icon (far more immediate than, for example, polluted rivers in some remote country). They successfully stimulated and then captured the concerns of the public for their own ends. The British magazine *New Scientist* (23.5.99) summed this up beautifully:

"Of course many opponents do not want a consensus about acceptable levels of risk. What they really want is for (GM) crops never to be grown because they object to them on ideological grounds. They recognise what many others don't: that this controversy is really an emotional and political battle in a wider war against unfettered free trade, globalisation and the power of multinationals. And you don't win such battles with science. You win them with propaganda."

8. The media. It is tempting for scientists, industry, and government to "blame the media" for having whipped up mass hysteria about GM foods. Although the media may not have helped, it seems to me that they are as likely to have responded to the tide of opinion as they are to have created it. However, facts were misrepresented (e.g., the 20 "world class scientists" who were reported as supporting Puztai's experiments, at least some of whom were not familiar with the work), and several newspapers carried out a campaign against GM foods.

CONCLUSIONS

In summary, the rejection by British consumers of GM foods has resulted from a complex concatenation of circumstances, including BSE as a special factor; misjudgments of public mood by scientists, government, and industry; and effective manipulation by anti-GM lobbyists.

Science, in general, and biotechnology, in particular, has suffered a setback in the UK. Opinion polls generally show that scientists are trusted, but this trust has been eroded in the past two years. Gordon Conway's phrase "A new way of talking and reaching decisions" is apposite. To regain the lost ground, restore public confidence, and reap the undeniable benefits of biotechnology for the future, all of the groups involved in biotechnology need to think again (University of Sussex, ESRC 1999). Scientists need more humility and engagement with society. Government needs to be more open in its decision making (the UK government has reorganized its regulatory structure, including the establishment of a new Food Standards Agency and a new cabinet committee on biotechnology). Industry needs to recognize that consumers cannot be steamrollered. The Shell Corporation thought that it could sidestep the concerns of many people when it opted to dispose of the *Brent Spar* in the North Atlantic. Monsanto thought that it could do the same with GM crops in the UK. Both were wrong.

RESPONSES TO THIS ARTICLE

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