

THE GM DEBATE

Mary Griffin reports on a debate held by SCI, the Society of Chemical Industry, at the Chemical Laboratory of the University of Cambridge in the UK on 2 November 1999

Motion

The motion for debate was:

“This house believes that genetically modified food can be good for the farmer, good for the environment and good for you”

Speaking for the motion were Professor Alan Malcolm, President of the Institute of Biology and Mr David Carmichael, farmer, and member of the NFU Biotechnology Committee and speaking against the motion were Mr Pete Riley, Friends of the Earth and Dr Len Copping, specialist in herbicide physiology. Mr James Clarke, Arable Technical Manager from ADAS Boxworth, acted as Chairman.

The debate was open to the public and had been widely publicised in the region. 119 people attended. Voting at the end was on a show of hands, and showed a clear majority in support of the motion.

For the motion

Professor Alan Malcolm

Breeding of animals and plants has been done for hundreds of years, and the proportion of household income that is spent on food has dropped this century from a third to an eighth. Cheapness of food is welcome. Of course technology can be bad: for example the motor car and television have led to problems, but society can identify the risks and deal with them. As far as GM foods are concerned the public have lapped up such products as vegetarian cheese, produced from chymosin transplanted into laboratory-based organisms, and cheaper tomato paste, made from lower water content tomatoes. By contrast, the opposition to GM soya is attributable to British xenophobia, as soya is produced overseas, and the British public has not been aware that soya products are used in so many foods. However, there is no difference between lecithin from GM and ordinary soya; the same applies for soya starch and protein. Modern analytical techniques are so good that this can be said with confidence. Consequently there cannot possibly be any difference between animals fed on products from GM or ordinary soya. An important question is: does the public trust the government to regulate the situation? The concept that applies to decisions over GM products is that of ‘substantial equivalence’, a somewhat woolly phrase that had been devised to allow, for example, for the difference between two apples of the same variety. In addition to GM products that are indistinguishable, it should be borne in mind that in countries where people go

blind for lack of vitamin A there could be significant potential benefit in producing crops such as rice or rape seed that include vitamin A, a substance that, in overdose, can cause poisoning. A benefit of insect-resistant maize would be that there would be no secondary infections from *Aspergillus*, and consequently no aflatoxin.

Against the motion

Mr Pete Riley

People are sceptical about assurances given by governments and by industry, and the public has been surprised that companies were so near to commercialisation of GM crops without checking the safety of the crops or the public’s reaction. GM soya and maize arrived in the supermarkets without proper consultation, and it appeared that these products were being rushed to the market. Cross-pollination is inevitable as pollen can travel large distances—4 km for oilseed rape. There are many wild relatives of oil-seed rape. What makes a plant an invasive weed is not known, but it appears that over the course of 10–20 years there will be a whole new generation of weeds. It is unclear who will pay for the damage, but it appears likely that growing GM crops will have an effect on land values. GM crops will have to be grown to a tight regime, which will require more paperwork. Consumers are now voting by avoiding products: for example Unilever’s product ‘Beanfeast’, based on soya, halved its sales over a 6-month period, so that now the GM soya has been removed from its production. The safety of GM foods is uncertain. A recent article in *The Lancet* by Harry Kuiper (of the State Institute for Quality Control of Agricultural Products in Wageningen, The Netherlands) has stated that the unintended effects of GM foods need to be examined. A complete halt to genetic engineering in the field should be called.

For the motion

Mr David Carmichael

GM crops are new techniques worth trying. As a farmer I have been seeking continuously to try new techniques all the time to cut costs and am trying to be kinder to the soil. For example, while Durum wheat can be grown in the south, I cannot grow it in the Midlands, and I need to consider new crops all the time. At present there are 85 million acres of GM crops being grown in the world, implying the readiness of consumers to accept such crops. In 1997, there was a reduction in herbicide use, an increase in yield of 47% and

an increase in return of \$29 per hectare as a result of GM crops. For example, sugar beet requires £200 per hectare spent on weed control, but if a GM herbicide-tolerant crop is grown only £60 per hectare needs to be spent. Last year I made a total of 36 applications of chemicals (nine applications of six different chemicals) to my beet, but a glyphosate-tolerant crop would have needed only a couple of applications of glyphosate. The effect of using Bt cotton (*i.e.* cotton containing the Bt gene, which codes for a protein toxic to certain insects) in the US was an increase in yield of 14% in 1997 and an increase in profits of \$133 per hectare, while in the state of Alabama there has been an 80% reduction in the use of pesticides. New crops for the future include high carotene-containing crops to save people's eyesight. The Sugar Beet Research Association has found that there were side benefits to the use of herbicide-resistant beet: weeds grow amongst the sugar beet, and the aphids prefer the weeds so that no insecticide is needed. In addition the growth of ladybirds is encouraged. Finally, when the weeds are killed with herbicide a mulch is produced that retains the water in the soil.

Against the motion

Dr Len Copping

The wording of the motion has been cleverly chosen because anything CAN be good for you. The question is: do the risks outweigh the benefits? In the case of foods the answer is 'no'. Transgenic organisms are the result of unnatural selection, examples being Bt maize and cotton, and Roundup-Ready (glyphosate-tolerant) soya, where the farmers end up being tied to the particular pesticide. Also, what will happen when the foreign genes escape? There would be Roundup-Ready weeds with the Roundup-Ready crop. As far as the Bt crops are concerned, there have been some advantages in the Southern US, but Bt is a very specific insecticide. If there are attacks by insects that are not affected by Bt then insecticides will still be needed. As for those insects that are affected by Bt, since the plants express the Bt toxin all the time then resistance will build up in the insect population. Also, the fecundity of insects feeding on the crop, such as ladybirds and butterfly larvae, will be affected. One result of the development of resistance will be that organic farmers will lose one insecticide that they are currently permitted to use. In the case of the herbicide-resistant crops, the lack of surrounding weeds will mean that there would be no shelter for animals, and nothing for insects to feed on, meaning a reduction in biodiversity. As for checking safety, in the US a variety of GM soya has been found to be allergenic, and this has been spotted, but would all potential problems be spotted? Of course not. The audience should vote against the motion.

Questions from the floor

A wide ranging series of comments and questions were then expressed from the floor, many of which were answered or further explored by the speakers for and against the motion.

- If a drought-resistant crop is developed, or a high-protein

crop, will those against GM technology deny such a crops to the people of countries like Chad?

- Why should there be any problem with gene transfer in a GM crop?
- Beef was declared to be safe, but there turned out to be problems – isn't it appropriate to be ultra-cautious with food?
- The arguments in favour for consumers are that GM foods would be cheaper and lead to enhanced nutrition. This is not yet the case, and I cannot see the benefit for the Third World
- There is always a risk with any technology, and the question should be whether the risk is acceptable? What is the risk and what are the consequences?

Summing up

Professor Malcolm said he had no difficulty in agreeing that the main debate was not scientific. He agreed with the opposer of the motion about many things. The market would decide the matter. In China, there was a large acreage of GM crops being grown. In the USA, 300 million Americans had been eating GM crops for 5 years, which must mean they consider GM foods to be safe. Pesticide levels are important, and they had dropped, and the associated costs had also dropped. The risk could be calculated scientifically, but there had been a problem at a psychological level in communicating the science of what was being done.

Mr Riley reminded the audience of the arguments. Intensive farming squeezes the small producers. GM crops would have serious deleterious consequences for biodiversity. Many of the claims made by the proposers were flawed. Corn borers, for instance, do not attack the seed heads of maize plants and would not lead to secondary infections of *Aspergillus* and aflatoxin production. There is clear evidence that, with food, safety is paramount. We had BSE despite assurances from governments and scientists, so why believe them now? We need to consider the world, the environment, and species diversity, and move away from high-input farming back to sustainable agriculture if not for our sakes, then for the sake of our children and our planet.

Results of the votes

	In favour	Against	Abstentions
After the debate	90	29	0

The debate goes on !!

Dr Mary Griffin researched into the physical chemistry of milk proteins at the Institute of Food Research, Reading, her work on the structure and functions of caseins leading to the award of the RSC Food Chemistry Group Junior Medal in 1987. She now works in University administration, continuing to teach undergraduate chemistry. She retains a keen interest in food issues. Dr Griffin has been a member of SCI for 12 years and currently sits on the Society's Cambridge and Great Eastern Section Committee.