

GM: The Politics of Uncertainty

The Rt Hon Michael Meacher MP



From a scientific point of view (as opposed to political), the questions are quite simple. Do GM crops cause harm to the environment or to human health? And do the benefits of GM foods outweigh the risks?

In 1999 the Government set up the Farm-Scale Evaluation trials to answer the environmental question. The report on the trials in 2003 found that GM oilseed rape and GM beet, because of the herbicide used which was part of the package, did indeed cause significant harm to wildlife and the environment. In the case of maize, the report found the reverse: that conventional cultivation caused greater harm than GM cultivation. But there were two reasons for this. First, conventional maize cultivation uses atrazine as the herbicide which is so toxic and damaging to the environment that it has now been banned throughout the EU, so that trials involving a chemical that will not be used in future are no longer valid. Secondly, Bayer told the GM maize farmers to carry out only one spraying with Liberty (glufosinate ammonium), so that the weeds would grow again and the environmental impacts would appear better. But farmers in real life, seeking to maximize yield, would never confine themselves to a single spraying.

The Government repeatedly stated throughout the trials that if GM crops were shown to cause harm to the environment, they would not license them for cultivation in the UK. That has now been conclusively demonstrated in the case of oilseed rape and beet. In the case of maize, if

a less toxic chemical weedkiller were substituted for atrazine as is now required, and if the normal two sprayings were used for GM maize crops, it is very likely that the same results would be found for maize as for oilseed rape and beet. The environmental case against GM is therefore clearly made. And that is even before the wider environmental impacts of GM are examined – namely the effects on soil residues and bacteria, transgene flows, and impacts on bird populations – all of which were excluded from the FSE trials because they were so narrowly drawn.

What is the effect of GM on human health? Astonishingly, there have been virtually no clinical tests of the effects of eating GM foods on human beings. Instead, the biotech companies compare any new GM product with its non-GM counterpart in terms of toxins, allergens and nutrients, and if they are broadly similar, they simply assume the GM product to be safe on the basis of the notorious principle of “substantial equivalence”. But substantial equivalence has no validity in science whatsoever.

There are very strong reasons why direct and specific health testing of GM foods is needed. First, GM technology is an uncertain and destabilising one, since genes are inserted randomly out of sequence. And genes don't operate in isolation; it is now known how to determine artificially a single function of a gene without triggering other unpredictable and undesired effects. Second, the vectors used are viruses or bacteria which often transfer out of the GMO into other organisms (ie horizontal gene transfer, for example

into the human gut, as in Newcastle study 2002). Third, allergic reactions can be quite widespread because the GMO is a novel product (as instanced in the StarLink maize episode in the US in 2000). Fourth, the broad-spectrum herbicides used with GM crops are extremely toxic: glufosinate ammonium is a neurotoxin and a teratogen (ie it harms embryos). And research shows a 10% reversion rate out of degraded herbicide back to the original toxic form in the human gut. Indeed, more generally, the Medical Research Council has concluded that more knowledge is needed of the effects of GM on metabolism, organ development, immune and endocrine systems, and gut flora.

There are therefore real, serious and unexplored risks from GM both to the environment and human health. Are the benefits then so compelling that it is worth taking these risks? Again, astonishingly, there are in fact no consumer benefits from GM at all, as the biotech companies themselves admit. But would GM, as is often claimed, help to feed the starving masses of the world? The truth is that world poverty and starvation derive from keeping developing countries in a grossly inequitable world trading system, from corrupt or bad governments, from gross maldistribution of land, from spiralling population increases, or from any combination of these. In the absence of controlling these fundamental causes, the role of GM is utterly marginal.

So when the GM benefit is insignificant and the downside risk is enormous, why take the risk?

GM: The Certainty of Science

Professor Alan D B Malcolm



Michael Meacher seems to have learned astonishingly little during his time as a Minister.

Food is a consumer product like no other because we need it, and because “Eating is the only sensual pleasure conducted by consenting adults three times a day in public”. Many of the world’s great religions have strong food taboos. It is therefore scarcely surprising that hysteria should be so rampant when anyone attempts to “adulterate” our food supply.

But Michael Meacher knows that high fructose corn syrup made from GM maize is chemically and nutritionally identical to that produced from “classical” maize, in just the same way as sugar from cane is the same as sugar from beet. None of these products contains DNA or potentially allergenic proteins. The same can be said of the emulsifier lecithin from GM soya, and many other products that are enjoyed by citizens of many countries.

The insect populations under GM sugar beet in Norfolk, and around cotton plants in China are MORE diverse than before, with a beneficial effect on the bird populations that thrive on them.

This does NOT mean that ALL GM products are safe – only those that have been produced and tested so far. Any new one needs to be individually scrutinised, as happened in the field trials that he was responsible for supervising. Even if a real hazard is identified, this no more damns an entire technology than a minor domestic electrical fault leads to the disconnection of the national grid.

Where GM is the only option

He knows that there are several products produced using GM

technology that are difficult or impossible to make any other way, such as human insulin produced by inserting the human gene into a bacterium, which is grown in culture. The GM-produced insulin has been injected every day into many millions of the population for over a decade – a challenging test.

Bt Cotton

Building the production of Bt toxin into the plant (instead of spraying bacteria over the crop, as the organic movement has been doing for half a century) can lead to a reduction in the use of noxious pesticides. In China, this has led to a reduction in organophosphate poisoning of peasant farmers. Rachel Carson might actually have been an enthusiast for Bt maize!

Consumers are not indifferent to production methods that may involve consequences, such as rising carbon dioxide levels, aesthetics of wind farms, risk of radioactive leaks or explosions, allergies to pollen from oil seed rape (canola), or objections to the yellow colour of the countryside.

The Complexity of Food

Food is a complex consumer product. We have more variation in type, size, colour, skin thickness, sweetness and texture of apples in my local supermarket than there are brands of television in my local branch of Dixons. Nutritionally, while not identical, the apples are *substantially equivalent*.

Food is not a consumer product like paper napkins or rolls of film or televisions. With the latter we know that million after million of the objects have been produced in a factory, and made identical to a high degree of precision. On the other hand we accept variability in our fruit and vegetables with varying degrees of goodwill. We

know that this week’s Brie will not be identical to last week’s, but it is substantially equivalent in terms of food safety, nutrition and enjoyment.

We are now all victims of the sloppy and irresponsible use of the term GM. The food that we have been talking about is not modified in any way whatsoever. The plant that gave rise to it undoubtedly has been.

But supposing we did eat the DNA of a modified plant? So what? Michael Meacher acknowledged on television a few months ago that he has been eating tomato seeds for over half a century and yet none of his cells shows any evidence of having been infiltrated by tomato genes.

Cross-fertilisation

What would happen if some seeds/pollen from these plants escaped and cross fertilised with indigenous plants? Of course the pollen will distribute itself widely – that is what pollen is for. Cross fertilisation is actually very difficult, except with highly similar species. The offspring of most of these crosses will die out in the absence of the original selective pressure. However when the one in a hundred million chance does happen, and an undesirable plant emerges, surely we will do what farmers did for millennia before the industrial revolution, and what I and my friends still do regularly on my allotment. We dig ‘em up and either compost or burn them.

Exactly so

There are challenges ahead. Some of the answers are not clear, and some of the political ones never will be.

Perhaps Michael does know all this, but is merely being economical with the

The author is Chief Executive of the (independently funded) Institute of Biology, and also a member of the Government’s Advisory Committee on Novel Foods and Processes, but is here writing in a personal capacity.