

DEBATE

Genetic modification and food

As the debate on genetic modification of our food grows more intense over the issues of product safety, and environmental concerns, *JACM* features both sides of the argument as first presented in *Environment and Health*.

Concerns about genetic modification

(Information from the WEN Biotech Campaign)
Benefits are greatly exaggerated, for example:

- Feeding the hungry world: Hunger is mainly a political problem, based on distribution and lack of access to resources. On the contrary, genetic engineering (GE) threatens long term food security and safety.
- There is little evidence of any success in increasing yield, resisting drought or salinity.
- There is no improvement in food quality.
- It is counter to sustainable agriculture and ecology. Long term, it will increase the use of and the need for weedkillers, fertilisers and pesticides.

Hazards are ignored or are vastly understated, for example:

- No adequate protection through regulation: European law accepts most GE food as 'substantially equivalent', thus opening the floodgates for GE food despite public and scientific concern.
- Apparent benefits often have problematic side effects, impacting on human health and safety and the environment.
- Allergenicity: Introducing novel components in food, or even known components in a new context, can cause food allergies, eg brazil nut genes in soya beans.
- Toxicity: Toxic substances or hormones like plant oestrogens can be produced in the edible part of the plant as a response to the novel gene it was given. This may depend on the conditions under which the plant is grown (eg fertilisers, herbicides, stress).
- Unknown side effects: Some possible

side effects are known, though difficult to test for, eg altered concentrations of vitamins, nutrients, anti-nutrients, hormones etc. We are only at the beginning of the research, and many effects of altering the genes of plants are simply not known and are thus not tested for.

- Stability and unpredictable side effects: Many field trials of GE crops showed that over time a novel gene can actually move position, make more copies of itself or vanish altogether, leading to an unpredictable situation regarding the crop behaviour. Furthermore, novel genes will often have other effects than they are meant to have, eg a gene for red put into petunia flowers made plants have more roots, hairier leaves and a lowered fertility rate.
- Horizontal gene transfer: Genes will spread to other species, as field trials with rape seed have shown. This will create 'superweeds' as many novel genes make the plant resistant herbicides (weedkillers) or pests.
- Emergence of superbugs: Many crops are genetically engineered to constantly produce their own pesticides. Insects faced with the deadly crop will either die, become rare or go extinct - or they build up resistance and will be tougher than ever before.
- Threat to biodiversity: For example, growing plants that constantly produce their own pesticides has in field tests already led unintentionally to the premature death of 50 per cent of beneficial ladybirds and reduced their fertility drastically.
- Threat to health: due to horizontal

transfer of virulence and antibiotic resistance genes. Furthermore, the use of viruses as carriers (vectors) for genes across the species boundaries accelerates the emergence and spread of pathogens and infectious diseases.

- Genetic engineering bypasses evolution and reshuffles genes across all species boundaries (eg fish to tomato, human to pig). The consequences are unknown and once the gene genie is out of the bottle it cannot be called back.

Profit motive often overrides safety concerns, for example:

- Safety tests are insufficient: GE development and releases are pushed too fast for adequate long term safety checks.
- No post release monitoring is performed (or required).
- No liability or accountability.
- Million dollar lobbying at the European Parliament to pass regulations tailored to the needs of the biotech industry
- 'Patenting for Life': Patenting of genes, plants and seeds to extend monopoly control by corporations (eg Monsanto, Novartis, Cargill). These patents impede research and enable companies to turn farmers into serfs.
- The 'need' for GE crops has been created by company interest.
- Gene revolution: Creates dependency on chemicals as once the green revolution did. Most companies developing GE crops are big agrochemical corporations (eg Monsanto, AgrEvo, Novartis).
- All non-GE crops, including organic, are in danger of contamination of pollen from GE plants.

Benefits of genetic modification: The food industry view.

Information from the UK Food and Drink Commission, an alliance of trade associations representing food manufacturing industry.

Benefits in crops production:

- Less crops lost due to disease and pests, for example potatoes able to resist colorado beetle, fruit trees resist codling

- Reduction in the use of harmful herbicides
- An increase in yield

Possible future benefits may include:

- Drought resistance
- Nitrogen fixing, as an alternative to

- Frost resistance

For more information look at the website <http://www.foodfuture.org.uk> or telephone 0171 836 2460.

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