



# Biotechnology Facts

Office of the United States Trade Representative

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## **Agricultural Biotechnology: Food Safety and Environmental Benefits**

### **Food Safety**

- The European Commission's Directorate-General for Research has stated that, "Research on the GM plants and derived products so far developed and marketed... has not shown any new risks to human health or the environment... Indeed, the use of more precise technology and the greater regulatory scrutiny probably make them even safer than conventional plants and foods." (European Union, Directorate General Research Press Briefing, October 8, 2001)
- "GM foods available on the international market have undergone risk assessments and are not likely to present risks for human health in any other form than their conventional counterparts." (World Health Organization, "Modern food biotechnology, human health and development: an evidence-based study", June 2005) [http://www.who.int/foodsafety/biotech/who\\_study/en/](http://www.who.int/foodsafety/biotech/who_study/en/)
- "Thus far, in those countries where transgenic crops have been grown, there have been no verifiable reports of them causing any significant health or environmental harm." (UN Food and Agricultural Organization, "The State of Food and Agriculture, 2003-04") [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/DOCREP/006/Y5160E/Y5160E00.HTM](http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/Y5160E/Y5160E00.HTM)
- "Based on the published scientific literature, this report examines the potential hazards and risks of consuming genetically modified (GM) plant products. Toxicity, carcinogenicity and food allergenicity, and the possible effects of consuming foreign DNA (including antibiotic resistance genes) are all taken into account. The report concludes that food derived from GM plants approved in the EU and the US poses no risks greater than those from the corresponding "conventional" food. ("Are there health hazards for the consumer from eating genetically modified food?", Union of the German Academies of Science and Humanities, Commission Green Biotechnology, InterAcademy Panel Initiative on Genetically Modified Organisms, Group of the International Workshop Berlin 2006)
- On the contrary, in some cases food from GM plants appears to be superior with respect to health. For instance, "Bt corn is significantly safer for human consumption because it contains two-to twentyfold lower concentrations of highly toxic mycotoxins." (Chassy B., 2002. Food safety evaluation of crops produced through biotechnology, *Journal of the American College of Nutrition* 21(90003): 166S-173S)

### **Environmental Benefits**

- "The safety of GM crops is generally assessed more intensely than that of conventionally bred crops because, in addition to the selection process performed during classical breeding, a thorough pre-market risk assessment of potential unwanted effects of the GM crop on the environment is a prerequisite to obtain permission to market any GM crop variety. The risks of GM crops for the environment, and especially for biodiversity, have been extensively assessed worldwide during the past ten years of commercial cultivation of GM crops. Consequently, substantial scientific data on environmental

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effects of the currently commercialized GM crops is available today, and will further be obtained given that several research programmes are underway in a number of countries. The data available so far provides no scientific evidence that the commercial cultivation of GM crops has caused environmental harm.” (“Ecological impacts of genetically modified crops: Experiences from ten years of experimental field research and commercial cultivation”, Olivier Sanvido, Michèle Stark, Jörg Romeis and Franz Bigler, Federal Department of Economic Affairs, Swiss Confederation, October 2006)

- **Pesticide Reduction:** According to the National Center for Food and Agricultural Policy (NCFAP), the planting of biotechnology-derived crops in 2005 reduced pesticide use by 69.7 million pounds in the United States from 2004 levels. This represents a further 12 percent decrease in pesticide usage compared with 2004. (<http://www.ncfap.org/whatwedo/pdf/2005biotechExecSummary.pdf>) Further, according to ISAAA, the accumulated reduction in pesticides for the decade 1996 to 2005 was estimated at 224,300 MT of active ingredient, which is equivalent to a 15% reduction in the associated environmental impact of pesticide use on these crops, as measured by the Environmental Impact Quotient (EIQ) – a composite measure based on the various factors contributing to the net environmental impact of an individual active ingredient. (<http://www.isaaa.org/>)
- “Bt cotton is spreading very rapidly in China, driven by farmers’ demand for technology that will reduce costs of pesticide application, and allow them to use their time more profitably. The evidence of 5 years’ experience with Bt cotton is that this technology is extremely valuable to over 4 million smallholders in China. They will be able to increase their yield per ha, and reduce pesticide costs, the time spent spraying dangerous pesticides, and the number of incidences of pesticide poisoning.” (Carl E. Pray, Jikun Huang, et.al., “Five years of Bt cotton in China – the benefits continue”, The Plant Journal, 2002, Vol 31, No 4. )  
<http://www.blackwellpublishing.com/plantgm/Pray.pdf>
- **Soil & Water Conservation:** No-till acreage—farmland in which plowing of soil is reduced or eliminated—increased substantially following the introduction of biotech crops in the United States. “The environment and society also benefit. As more acres are converted to no-till, crop fields will become a significant trap for carbon dioxide, reducing the possibilities of global warming. As more fields are converted to no-till, the water cycle will return to a more natural state, more closely resembling the way it was in the days of the prairies and forests. Rather than running off the land, carrying sediment, contaminants, and pathogens into surface water, more water will infiltrate into the soil and move to streams by tile drainage and natural subsurface flow. This will allow better use of water and nutrients by crops and allow soil colloids and biological activity to filter the water before it becomes stream water. Quality of surface water in streams will more closely resemble shallow ground water than it does today. Moving more water through the soil will also reduce fluctuation and impacts of flooding and low stream flow” (“Better Soils, Better Yields: A Guide to Improving Soil Organic matter and Infiltration with Continuous No-Till, Conservation technology Information center, 2001) CTIC also reported in 2002 that increased use of conservation tillage practices reduced soil erosion by nearly 1 billion tons and saved \$3.5 billion in sedimentation treatment costs.
- “In the first piece of research into how genetically modified (GM) herbicide tolerant crops could be used to benefit the environment, scientists from Broom’s Barn Research Station in Suffolk show that creative use of GM crops could bring back increasing numbers of endangered wildlife and birds such as skylarks and finches. This new research, to be published in Proceedings B, a learned journal produced by the Royal Society, suggests that GM herbicide tolerant crops could

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be a powerful tool in developing sustainable farming systems in the future.” (Royal Society Press Release, January 15, 2003, announcing the February 2003 publication of the article “A novel approach to the use of genetically modified herbicide tolerant crops for environmental benefit” in the Proceedings of The Royal Society.)

- “Biotechnology helps farmers produce higher yields on less land. This is a very environmentally favorable benefit. For example, the world’s grain output in 1950 was 692 million tons. Forty years or so later, the world’s farmers used about the same amount of acreage but they harvested 1.9 billion tons -- a 170% increase! We would have needed an additional 1.8 billion hectares of land, instead of the 600 million used, had the global cereal harvest of 1950 prevailed in 1999 using the same conventional farming methods. If we had continued practicing conventional farming, we would have cut down millions of acres of forest, thereby destroying wildlife habitat, in order to increase cropland to produce enough food for an escalating population. And we would have to use more herbicides in more fields, which would damage the environment even more. Technology allows us to have less impact on soil erosion, biodiversity, wildlife, forests, and grasslands.” (Dr Norman Borlaug, Nobel laureate)  
<http://www.actionbioscience.org/biotech/borlaug.html>
- “The priority is to feed the people, but we must do it in a way to keep as much biodiversity as possible. I have screened thousands of studies and scientific peer-reviewed papers and I have not seen single documentation of permanent negative impact on biodiversity done by genetically engineered crops. It’s a myth that this has happened. I cannot understand why people are against this technology. If we want to survive as human beings on this planet, we need to produce more food on smaller amounts of land. This is certainly done best with biotechnology. We cannot do that by just romantically following on old-fashioned agriculture. We must come to terms with using modern technology.” (Dr. Klaus Ammann, Honorary Professor Emeritus at the University of Berne, Switzerland, member of the Biosafety Committee for Switzerland.)  
<http://www.biotech-gmo.com>.