

## Chapter 27:

# Public Concerns About Biotechnology

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### Introduction

Modern biotechnology has the potential to significantly increase the quality and quantity of food and other needed products. Developing countries may benefit from these new crop varieties designed to have enhanced nutrition, while minimizing the impacts on the environment. The potential benefits of biotechnology, however, will only be realized if society accepts the science and new products as safe, effective and ethical. As is clear from the current climate such acceptance is not guaranteed.

Biotechnology has become the focus of a social conflict that is seriously limiting the willingness and ability of developing countries to adopt biotechnological innovations. On one level, this conflict is being waged by a coalition of green groups against the biotechnology companies. This aggressive campaign has forced some food companies and others in Europe to make the questionable promise that their products contain no “genetically modified organisms” (GMOs). This sends negative signals all the way back to the farm level. These green groups are opposed to most forms of modern agriculture and view biotechnology as a convenient and easy target to support their actions.

The second level of conflict is taking place between those countries that support the development of GM crops (including the United States, Canada, Australia and most developing countries) and the European Union (EU). The EU has imposed a lengthy and costly moratorium on approvals of new GM crops. In fact, the situation will become worse as the EU tries to implement a costly, unworkable, and politically motivated traceability system. This conflict reflects fundamental differences between the USA and EU in philosophy, culture, the regulatory environment and other factors.

The most unfortunate impact of these conflicts is that poor people, who could benefit most from biotechnology, are unable to take advantage of the real benefits available now and in the future. Because of Europe’s opposition to biotechnology, developing countries are discouraged from adopting the new crops. This has become so critical that several African countries have been

pressured to reject free US grain that is aimed at feeding starving people, simply because it is genetically modified. Much of the reason for varied responses to this pressure in Africa involves concern over the potential for lost exports to the EU. As a result, starving people are not allowed to consume the safe and beneficial foods that are available. Such a situation is clearly not sustainable in a global market.

The conflicts over biotechnology are complex. Debates have been underway for years over the safety of GM crops for the environment and human health. Most experts now agree that these products are as safe as (or even safer than) conventional agricultural production systems. However, biotechnology has become a “lightning rod” for a diverse set of political, social and economic issues (many of which are not resolvable by scientific analysis or regulation).

The range of issues includes concerns about corporate control over the food system and concentration within the agricultural input sector. Questions are also being raised about the distribution of the benefits and risks of biotechnology (i.e., that only certain groups will benefit while others are faced with risks). Biotechnology has also become a symbol of globalization, which is often a code word for “Americanization”. Trade issues are becoming more complex as it becomes clear that it is difficult to economically segregate grains to meet the standards being set in Europe. Unfortunately, this does not really matter to the EU leaders or consumers because they already have enough food available for the foreseeable future. If anything, consumers in the industrial countries have too much food (as evidenced by the high rates of obesity).

Developing countries have unfortunately been caught in the middle of these conflicts. Some countries are forced to curtail investment in new product development and even adoption of crop varieties developed elsewhere. The slow pace of adoption will ultimately mean more people will die from hunger-related diseases. Therefore, it will be important to understand how people in various countries react to the products of biotechnology. It is particularly important to determine whether consumers in the developing countries are similar to their counterparts in the USA or Europe in their responses to biotechnology.

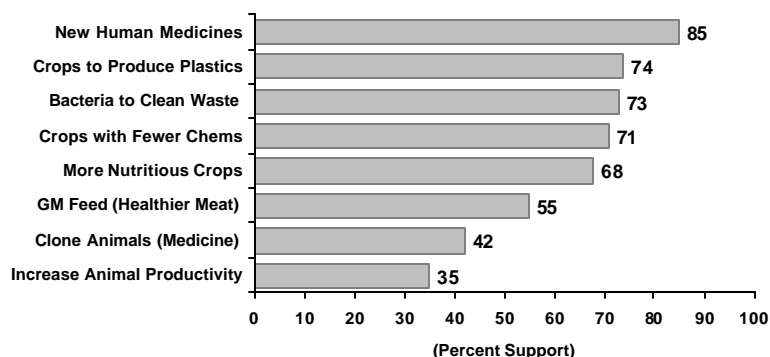
## **Social Acceptance of Biotechnology**

I will explore the extent to which consumers in different parts of the world have similar or different views about biotechnology. It is very costly and complex to conduct global public opinion research. Environics International of Toronto, Canada, completed interviews with 35,000 consumers from 35 countries (Environics International, 2000). These results allow us to understand better the overall climate for biotechnology acceptance around the world.

### Acceptance of different biotechnological products

One of the key questions to ask is whether there are differences in public acceptance of different biotechnological products. Survey respondents were asked whether they would support or oppose the use of biotechnology to develop each of eight different applications of biotechnology (Fig. 27.1.) Almost all respondents (85%) indicated that they would support the use of biotechnology to develop new human medicines. It is interesting that 15% would oppose the use of biotechnology even for such a clearly beneficial use. About three-quarters of people reported support for environmental clean-up and each of three different crop applications.

It is most important to note how any mention of “animals” causes support to drop. Just over half (55%) expressed support for GM animal feed (even when this resulted in healthier meat). Only 42% supported the use of biotechnology to clone animals for medical research. In fact, almost three-quarters of global consumers opposed the genetic modification of animals to increase productivity. Animal biotechnology involves a series of complex ethical, emotional and environmental issues that so far have not been adequately discussed or addressed. Plant biotechnology appears relatively popular by comparison.



**Fig. 27.1.** Public support varies for different applications of biotechnology (includes 35 countries –  $n = 35,000$ ) (source: Environics International, 2000).

### Geographical variations

The next step in this analysis will be to assess how the public reaction to biotechnology varies around the world. Respondents to the Environics study

were also asked the extent to which they agreed or disagreed with the following statement: "The benefits of using biotechnology to create genetically modified food crops that do not require chemical pesticides are greater than the risk." Results for the various countries are shown in Table 27.1. This is the most extensive research available with such a global perspective.

**Table 27.1.** Consumer response to the statement "The benefits of using biotechnology to create genetically modified food crops that do not require chemical pesticides are greater than the risk." (Source: Environics International, 2000.)

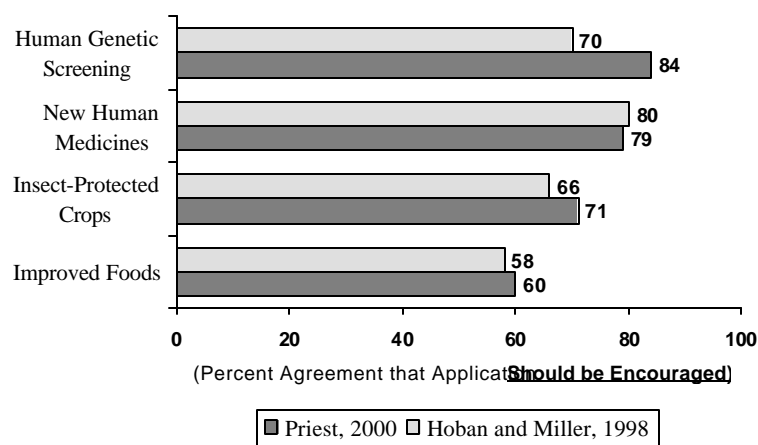
	Agree (%)	Disagree (%)
<b>The Americas</b>		
United States	66	27
Canada	55	37
Mexico	62	24
Argentina	44	31
Brazil	55	32
Chile	47	37
Colombia	66	26
Cuba	79	4
Dominican Republic	69	25
Panama	59	34
Peru	58	26
Uruguay	46	23
Venezuela	64	17
<b>Europe</b>		
France	22	54
Germany	41	49
Great Britain	42	47
Greece	22	54
Italy	34	48
Netherlands	55	37
Poland	41	27
Spain	39	36
<b>Asia and the Pacific Rim</b>		
Australia	44	42
China	72	17
India	69	18
Indonesia	81	16
Japan	33	39
Korea	43	47
Philippines	62	20
Thailand	72	17

Note: Percentages who agreed or disagreed do not equal 100% because varying percentage of respondents had "no opinion" or were neutral.

Some clear patterns are evident in public response to this question. Over two-thirds of respondents in the following countries agreed that the benefits of GM crops are greater than the risks: United States, Colombia, Cuba, Dominican Republic, China, India, Indonesia and Thailand. On the other hand, fewer than 40% of consumers in the following countries saw the benefits as greater than the risks: France, Greece, Italy, Spain and Japan. The overall pattern is that Europe, Japan and South Korea are much more negative than other parts of the world. The USA leads the industrial countries in support for biotechnology. Overall, developing countries tend to be quite supportive of GM crops.

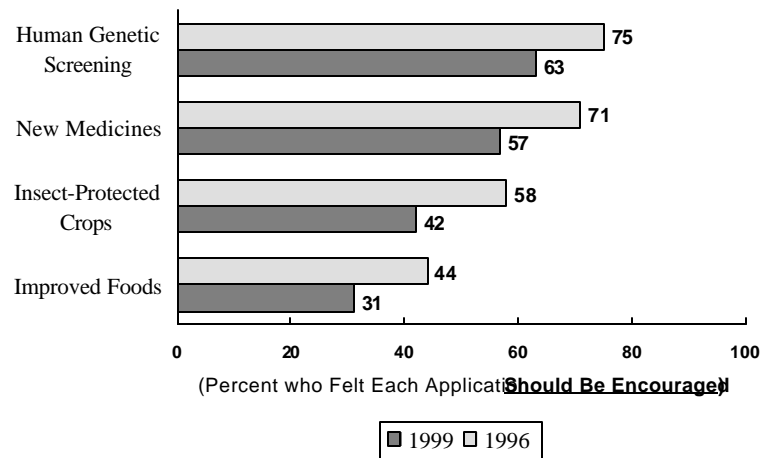
#### *Changing American and European perspective*

Results from other surveys indicate the extent to which the USA and the EU differ in their acceptance of different applications of biotechnology. The trends in public opinion seem to be diverging even farther. Surveys conducted by Hoban and Miller (1998) and by Priest (2000) evaluated trends in American consumers' support for four applications of biotechnology (Fig. 27.2). Compared to 1998, a greater percentage of US consumers in 2000 believed that applications of biotechnology to crops and foods should be encouraged. It is interesting to note that consumers tended to view insect-protected crops as more acceptable than improved foods. Support for development of new human genetic screening techniques rose significantly between 1998 and 2000. At the same time, concerns have been raised in the media about loss of genetic privacy and the potential for discrimination that could result from increased access to such genetic information by insurance companies, employers and others.



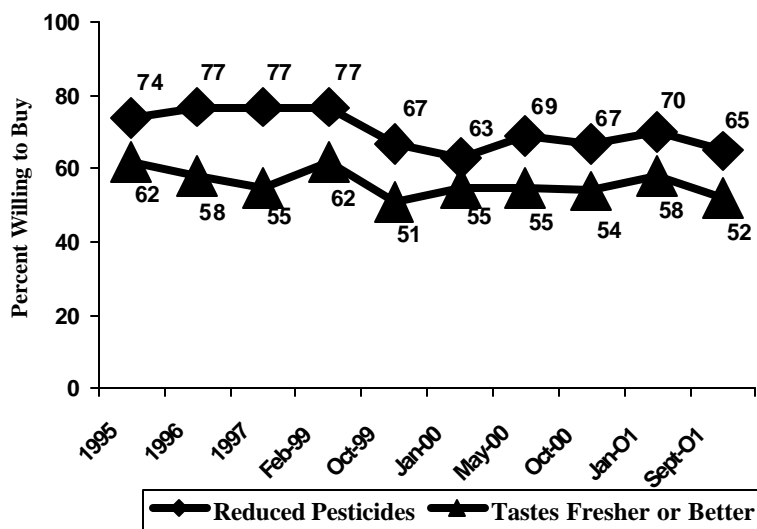
**Fig. 27.2.** American consumers continue to support all applications of biotechnology.

It is instructive to compare these results from the United States with trends for the same questions asked on the Eurobarometer in 1996 and 1999 (Fig. 27.3). In Europe, public support for all four applications of biotechnology dropped significantly during this period, which corresponds to the growth of the public controversy. It is understandable that agricultural and food applications would become less acceptable given the fact that they were the focus of opponents' campaigns. However, it is noteworthy that support for the two medical applications of biotechnology also dropped significantly. Such a pattern could mean some difficult challenges for the European economy and diminished prospects for new advances in health care. It is interesting that the European government has chosen to not repeat these questions again on a more recent Eurobarometer (see <http://europa.eu.int/comm/dg10/epo/>).



**Fig. 27.3.** Support among European consumers for all applications of biotechnology dropped significantly between 1996 and 1999 (source: Eurobarometer).

Consumers in the USA need to understand and recognize benefits from biotechnology. In other words they want to know why biotechnology is being used. Trends in US acceptance of genetically modified crops over a 6 year period are shown in Fig. 27.4. Acceptance of crops with reduced pesticides has remained fairly strong over that time. Willingness to purchase did drop somewhat during 1999 (but has since rebounded a bit). This corresponded to the point when media coverage of the controversy started. Consumers are even more supportive of crops that they perceive to be safer, than for crops that are better tasting.



**Fig. 27.4.** American consumers' willingness to buy produce modified with biotechnology has been consistent (source: FMI and IFIC).

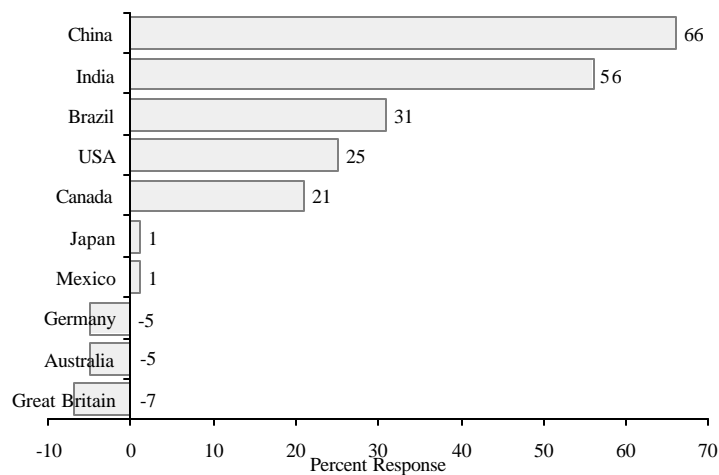
Enhanced nutrition should appeal more directly to consumers in developing countries. In a recent study entitled the "Food Issues Monitor", Environics International (2001) asked consumers in ten countries whether they would buy food with GM ingredients if the resulting products were higher in nutrition (Fig. 27.5). Respondents were given the option of continuing to buy the particular product or to stop buying it if they learned it was genetically modified. Consumers in China and India are clearly the most enthusiastic about these crops. There is also support among consumers from the USA, Brazil and Canada. On the other hand the European and Australian consumers would still tend to reject more nutritious crops. This makes sense since these countries are not experiencing food shortages or hunger. It also indicates that even new GM crops with clear consumer benefits will not overcome European opposition.

## Implications

### Need for social research

There is a great need for more research like the type reported here. In particular it will be useful to monitor trends in public opinion by repeating this type of

research at regular intervals. Scientists and other leaders need to understand what people truly think and want to know about biotechnology and related issues. Our experience in the United States and elsewhere shows the importance of communication programmes for opinion leaders and interested consumers. Research also shows that most consumers do not really think or care about biotechnology or related issues. The activist groups who claim to represent consumers are the ones driving the conflict. They really represent just another special interest trying to promote their own agenda.



**Fig. 27.5.** Willingness to buy GM food if more nutritious (Net score = % who would continue to buy – % not continue) (source: Environics International, 2001).

### Product vs process debate

It is useful to compare the different ways in which the USA and the EU are approaching genetically modified crops. At the policy level, the USA has taken a science-based approach to regulating the *products* of biotechnology. Europe, on the other hand, has adopted an approach based on politics that regulates the *process* of biotechnology. The EU regulatory approach reflects an underlying focus on risk that is characterized by caution. New biotech food products are perceived to be risky until they can be shown to be safe. The USA, on the other hand, has shown more enthusiasm toward new technology and progress. The USA tends to view new products as safe unless they are proven risky.

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### **Differing agricultural production systems**

The USA and EU also have very different agricultural production systems. The US system is based around enhancing the efficiency of commodity production. This is reflected in an agricultural system characterized by larger and fewer farms. The EU agricultural system is based more on specialized crop production and the notion of traceability. The EU tends to have more, smaller, and less productive farms. This is desirable for many Europeans who seek more direct contact with farms for weekend visits. This is also reflected in relative food prices. American consumers spend about 11% of their income on food, whereas European consumers spend over 20% of their income on food. Many of the poor in the developing countries spend most of their time and energy trying to obtain adequate food to simply stay alive.

### **Confidence in the regulatory systems**

There are other reasons why opinion has remained more positive in America than in Europe, despite the best attempts of activist groups to promote fear and uncertainty in both. American consumers tend to have a greater level of confidence in scientists and government regulatory agencies. In Europe, public confidence has been seriously eroded by mad cow disease and similar concerns. Scientists and others have been actively committed to providing the American public with information for over a decade, whereas EU leaders and scientists have generally been silent or ineffective. The activists who oppose biotechnology have relatively little credibility in the United States, partly as a result of their fear tactics. In Europe these groups have filled the information vacuum and established credibility with the public.

### **Cultural differences**

Americans also have feelings about agriculture and food that differ from those of Europeans. Many Europeans *live to eat* whereas most Americans *eat to live*. European consumers are more concerned with how food is produced and by whom. They have closer connection to farming, due in part to the fact that they have few public wilderness areas. Their concept of natural is tied to small-scale farming. This ideology is also present in the United States among elite consumers of organic food. American cultural values include a much greater appreciation for the role of science and technology in progress and economic growth. Most developing countries also look to the future with hope and see technology as a key factor in enhancing their quality of life. In fact, many are actively (but quietly) developing and field-testing GM crops.

## Conclusion

The future of biotechnology depends on how well scientists, political leaders, and others are able to communicate with the public. It is also important to target information to public officials, food industry leaders, the media, and other opinion leaders. One of the main reasons for the greater EU opposition to biotechnology is that the activist groups were ready, willing, and able to get their messages of fear out first, and often. Of course, it is much easier to provide misinformation than to wait for the scientific process to reach its conclusions. The greens launched their aggressive campaign mainly aimed at promoting doubt (since there is no scientific evidence of any negative impacts). Scientists and industry in EU now face an uphill battle to dispel the green myths and promote more reasonable decisions.

Research and experience have provided some guidelines for providing relevant information to interested consumers about agricultural biotechnology. The first thing that people generally want to know is why scientists are using biotechnology. In other words, what are the benefits? In fact, many US consumers appreciate the potential of biotechnology for helping people in developing countries to feed themselves. American consumers also have an appreciation of the fact that food produced with biotechnology is as safe as, or safer than, food produced through traditional breeding methods and grown with more chemical inputs. It is also important to make the point that no technology is without risk and that those associated with biotechnology are being managed and regulated.

Given enough time and effort on the part of scientists, the benefits of agricultural biotechnology should become evident. In the meantime, the social conflicts over biotechnology will continue. The poor in the developing countries must have their interests more effectively represented in the court of global public opinion. Changes may occur once it becomes clear how resistance to biotechnology in Europe is contributing to food scarcity and starvation in developing countries. Developing countries need to stand up for their rights to use technology that has been shown to be both safe and effective.

## References

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