
By Susanna Hornig Priest

Biotechnology in food and agriculture

Hidden Differences



Few Americans are neutral in their views on biotechnology. Surveys have shown that majorities consistently favor the use of genetic engineering in agriculture and food production. Support is even stronger for many medical applications. But a large proportion—as much as one-third—is not convinced these technologies are benign.

In the spring of 2000, the Public Policy Research Institute at Texas A&M University conducted a study to probe United States opinion on the use of biotechnology-based processes in agriculture and food production. The work was carried out in cooperation with the International Research Group on Biotechnology and the Public, coordinated by George Gaskell at the London School of Economics. The results indicated that a majority (about 53%) of the US population believed that, in general, genetic engineering would improve the quality of life in the next 20 years.

But a substantial minority (about 30%) said this technology would make things worse. Unusually con-

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sistent with these results were those of another national telephone survey done about a year later by the Gallup Organization. In July 2001, Gallup found that 53% of the US population did not believe foods produced using biotechnology posed a serious health hazard, while 30% did.

Context is important for understanding these data. Despite widespread evidence of reservations, biotechnology-related worries did not rank very highly on the list of all food-related concerns for respondents to the Texas A&M study. While 27% said they were very concerned about genetically engineered foods or biotechnology, this was the smallest percentage for any of eight food safety items tested. Nevertheless, the reservations expressed by this minority pose a substantial challenge for the food and agriculture industries.

And while biotechnology may have been the least controversial food safety item in our study, it was among the most controversial technologies overall. The 53% of respondents who were optimistic about the impact of genetic engineering on the quality of life comprised a far smaller majority than the 88% who felt solar energy would improve our way of life over the next 20 years. Eighty-eight percent felt the same way about computers and information technology, 82% about telecommunications, 72% about the internet, and 62% about space exploration. Only nuclear energy, with 43%, drew a less positive response than genetic engineering, according to this measure.

Further, those with reservations about biotechnology appeared to be spread across the political and religious spectrums rather than representing a single group (see Figure 1). Biotechnology pessimists were a little more likely to be nuclear energy pessimists, but overall they did not seem to be the same group of people; resistance should not, in other words, be ascribed to a Luddite “fringe” of political or religious extremists from either the right or the left.

The term “biotechnology” encompasses a broad variety of techniques, some involving genetic manipulation and some not. Sixty percent of our respondents definitely agreed or tended to agree that food production biotechnology should be encouraged; for crop biotechnology (e.g., engineering for pest resistance) the comparable number was 71%. As has been observed in other studies, support for medical applications was higher, with 79% wanting to encourage the use of engineered bacteria for medicine production and a surprising 84% in favor of encouraging genetic testing.

Presumably, medical applications have more support because, in a society in which food is abundant, a greater need is seen for medical than for food applications. However, only 51% of our respondents wanted to encourage cloning an animal “such as a sheep” whose milk might contain useful drugs. And only 55% would encourage putting human genes into animals to produce organs for transplant. These responses certainly suggest a more complex picture in which support depends more

on the specific application than on whether the technology is used for food or medical purposes.

Why has the US public been portrayed as homogeneously pro-bio-

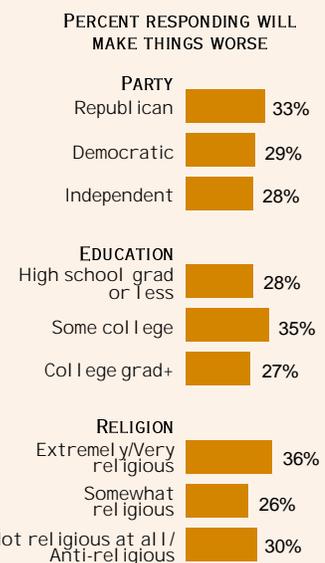
technology? Not surprising, the attention of the biotechnology industry seems to have focused on consistent indications of majority support for the use of its technologies in food and agriculture. This emphasis may have helped mask the widespread existence of concerns about risks—even among some who foresee significant benefits.

Figure 1

Biotech Qualms by Subgroup

Question:

Science and technology change the way we live. I am going to read out a list of areas in which new technologies are currently developing. For each of these areas, do you think it will improve our way of life in the next 20 years, will have no effect, or will make things worse? ...Genetic engineering.



Source: Survey by the Public Policy Research Institute, Texas A&M University, April 10-May 3, 2000.

Another striking finding of our study was the degree of polarization: relatively few Americans felt neutral about many issues associated with biotechnology across a broad range of applications, including food biotechnology. This may also have been masked by researchers' habitual focus on simple majority opinion rather than its distribution.

For example, 37% of our respondents moderately or strongly agreed that the risks associated with genetically modified or "GM" food were acceptable, even more—43%—moderately disagreed or strongly disagreed with the question asked in this form. But just 7% said they neither agreed nor disagreed. Thirteen percent said don't know or refused to answer.

Similarly, 47% moderately or strongly agreed that only traditional breeding methods should be used in food production while 37% moderately or strongly disagreed, with only 7% remaining neutral (9% don't know or refusals). Forty-five percent moderately or strongly agreed that "even if GM food has benefits, it is fundamen-

neutral (10% don't know or refusals). In other words, it appears there is broad concern about possible risks, but even broader recognition of the potential benefits of genetically modified foods. Under such circumstances, different respondents undoubtedly weighed the costs and benefits differently.

In addition, change that has occurred in the US since a comparable (unpublished) study was conducted in 1997 by Jon Miller, now Director of the Center for Biomedical Communications at Northwestern University, has been largely in the direction of further polarization rather than a shift toward either the positive or the negative pole. While 12% of Miller's respondents thought genetic engineering would have no effect within 20 years, only 5% thought so in 2000.

These results suggest a public opinion climate in which overall majority support has tended to marginalize concerns that are actually broadly shared. When individuals believe themselves to be in a minority, they are probably

While spiral of silence research since the initial development of this theory has produced mixed empirical results, in part because of methodological challenges associated with demonstrating its operation in particular "real world" circumstances, it remains a very useful concept for purposes of thinking about the dynamics of how public opinion works in a pluralistic democracy.

Individuals are constantly situating themselves in relation to what they see as the probable range and mode of the public opinion distribution, as well as the distribution within reference groups important to them. While they are unlikely to change opinions they believe to be in the minority as a result of this process, their willingness to speak out—and quite possibly their willingness to take public action, which of course requires speaking out—can certainly be affected.

This can easily lead to the kind of opinion climate in which a public consensus appears to exist when it does not. But the opinions do not necessarily go away; spiral of silence is a theory about opinion expression, not opinion formation.

Strong reactions to developments in areas like food biotechnology, for which a solid majority has appeared to be supportive, can give the impression that public opinion is volatile or fickle, and easily influenced by relatively minor matters—situations that appear to carry little substantiated consumer health risk. But these reactions do not always mean that opinion has suddenly changed. Rather, it may be more useful to think of this as a process by which concerns and reservations that were not previously articulated (or in some cases even fully formulated) in popular thinking suddenly find a means of focus and expression.

"Overall majority support for food biotechnology has tended to marginalize concerns that are actually broadly shared."

tally against nature;" 42% moderately or strongly disagreed, but only 5% were neutral (8% don't know or refusals).

Despite widespread concerns, 63% moderately or strongly agreed that genetically modified food would bring benefits to a lot of people, while 20% moderately or strongly disagreed and 8% were

less likely to express their opinions for fear of damage to how others see them in the form of disapproval or even ostracism. This is the chief assertion of Elisabeth Noelle-Neumann's influential "spiral of silence" theory and might be thought of as a societal-level variation on the older "groupthink" idea that describes conformity pressures on individuals interacting in small groups.

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Hearing others express reservations, individuals who might previously have thought of themselves as relatively isolated in their “back of the mind” concerns are suddenly reinforced in their opinions by discovering the existence of others like themselves. Nagging doubts become salient. Dissenters discover compatriots. But the chain reaction that results need not always be interpreted as springing from a sudden shift in public opinion—only in its expression.

Food biotechnology is an excellent example of this phenomenon. Public outcries in response to events such as the appearance in taco shells of genetically modified corn unapproved for human consumption, proposals to allow genetic food products to be officially labeled “organic,” or the use of genetically engineered growth hormone to boost dairy cow production seem to have startled industry and agriculture alike. They appear to have sprung out of nowhere.

In fact, they have sprung from a population increasingly aware of genetic engineering, and in many cases, increasingly wary. Even industry figures show drops over five years in consumer confidence that biotechnology will provide benefits within five years to themselves or their families, with International Food Information Council figures indicating 59% agreement in May of 2000 (very close to the time of our survey, and with very comparable results) compared to 78% in 1997.

Overall, Americans lean toward optimism regarding biotechnology, but a substantial minority has concerns. This minority is not confined to a single demographic group but crosses religious, political, and educational lines. Even though fears of the safety of engineered foods are not high in comparison to other food issues, moral concerns are common. It seems safe to predict that controversy in this area is unlikely to go away any time soon. ●

Continental Divide

The European population is often compared to the US population in terms of support for biotechnology. The comparison can sometimes be misleading. For example, only about 34% of Europeans surveyed in a comparison study would encourage food biotechnology, compared with 60% (unweighted) in the US. But this number ranged from 23% for Austria to 49% for Finland and the Netherlands.

Moreover, a recent unpublished study by the author and others indicated no clear or simple relationship for European respondents between level of technical knowledge and level of support. While both contributed to support, it seemed to depend more on patterns of trust in relevant institutions, with the US reflecting much more positive attitudes toward industry than toward environmental and consumer groups.

And for both the US and Europe, moral reservations were not confined to medical applications. Over one-fourth of our US respondents (26%), like 41% of the Europeans, definitely disagreed or tended to disagree that food biotechnology was morally acceptable. The differences between the two populations appear to be matters of degree rather than kind.