

Consumer Preferences and Policies related to Genetically Modified Foods

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Uses of biotechnology in agriculture are widespread in the United States, in particular in production of corn, soy and milk. These foods are used in many processed foods, thus use of biotechnology-derived ingredients is widespread in the U.S. food supply (1,2). National surveys indicate American consumers have been generally supportive of food biotechnology (3,4,5). In surveys conducted between 1997 and 2001, 50-60% of consumers stated that they were likely to purchase vegetables that had been modified by biotechnology to taste better or fresher and more than 70% stated they were likely to purchase vegetables modified to be protected from insect damage (5).

Although American consumers have expressed general acceptance of food biotechnology, there is also a lack of knowledge about the topic. For example, 41% of 1,002 participants in a 1999 survey felt they did not have enough information to form an opinion about using biotechnology in seeds or plants (4). Only 36% of 1000 respondents surveyed in 2001 were aware that foods produced through biotechnology are currently sold in the supermarket (5). There was massive media coverage of a recall of products made with StarLink corn in 2000. However in a January 2001 survey, 53% of respondents said that had read "nothing at all" about the recall of StarLink corn products (5).

Consumers in many other countries appear to be more skeptical than American consumers regarding whether food biotechnology is safe and/or beneficial. In Europe, acceptance has declined for both food and medical applications of biotechnology. Surveys of Japanese consumers have yielded conflicting results. Hoban reported that Japanese consumers are accepting or neutral on biotechnology (6). However, a 1999 survey by the Japanese Agriculture, Forestry and Fishery Finance Corporation indicates that Japanese people are quite concerned about food biotechnology, with only 12% of respondents stating that they had no negative feelings about food biotechnology (7).

Two of my graduate students, Masami Toyama and Jason Heffernan conducted surveys of Japanese and Washington consumers to assess their knowledge and attitudes regarding food biotechnology. Two similar questionnaires were developed - one in English and the other in Japanese. The English language questionnaire was mailed in March 2000 to 500 Washington state residents whose names were randomly selected from a statewide database of names listed in white page telephone directories. The Japanese language questionnaire was mailed in June 2000 to 500 residents of Kumamoto, Japan whose names were also selected from telephone directories. The response rate for deliverable surveys was 53% (n=241) for the Washington survey and 64% (n=309) for the Japanese survey.

The Washington respondents were most likely to agree that citizens have too little say in whether biotechnology is used in the food supply, and that the government should pay more attention to what people think about biotechnology (8). Less than 20% of

respondents agreed with the statement that biotechnology should not be used because of potential risks to the environment. Females were more likely than males to be concerned or unsure about potential environmental risks from biotechnology applications ($p < 0.01$).

The American respondents were asked two questions about their potential purchase of genetically modified corn. When the question focused on reduction of pesticide use, half of the group found the application acceptable. However, almost all also felt it was important to consider risks to non-target species.

Almost half of the Washington respondents were supportive of agricultural uses of biotechnology, with 18% expressing opposition. Although the percentage opposed to biotechnology is not a majority, this level of opposition to biotechnology applications should not be viewed as irrelevant since a relatively small group of vocal opponents can be quite effective at soliciting change. For example in March 2001, Starbucks Coffee Company shops were picketed by activists, who demanded that Starbucks stop using genetically modified foods. The Starbucks president quickly responded with an announcement that the company had begun efforts to use milk free of genetically modified bovine growth hormone and said, "If I've got 10% of my customer base that's concerned about this issue, I'm concerned." (9)

The majority of Washington respondents either felt that food biotechnology regulations were "too lax" or else they did not have an opinion. In January 2001, in response to input from consumers, manufacturers, and others, the Food and Drug Administration proposed mandatory rules that would tighten the scrutiny of biotechnology foods (10).

Only 37% of the Washington respondents were aware of the widespread presence of biotechnology products in the American food supply. Many also were uncertain regarding food biotechnology. For each statement about risks and benefits, a substantial minority (usually more than 20%) of the respondents chose the "not sure" response.

The results from the Japanese survey had both similarities and differences from the Washington survey (11). When Japanese respondents were asked about their attitude toward the use of biotechnology in food, only 6% answered that they felt very positive about it, 11% felt somewhat positive, and 58% felt somewhat negative, or very negative about the biotechnology in food. Female respondents had more negative feelings than males ($P < 0.01$).

Japanese consumers were asked, "As far as you know are there any foods produced through biotechnology in the grocery store now?" Although many Japanese processed foods contain genetically modified ingredients, only 34% of the respondents answered yes, and 25% and 39% answered no or don't know.

The Japanese respondents were asked to read a series of attitude statements about food biotechnology and indicate how strongly they agreed or disagreed with each statement. They were most likely to agree that government should fund more biotechnology research because of the potential benefits, and that government should pay more attention to what people think about biotechnology. Forty percent agreed that citizens have too little say in decisions about whether or not biotechnology should be used. Some negative personal opinions about biotechnology were notable. Only one-third of the Japanese respondents agreed with the statement that biotechnology would personally benefit consumers in the next five years. Also, 76% agreed with the statement, "Biotechnology should not be used because of potential risks to the

environment.” Most of the respondents (73%) agreed with the statement, “Only the companies who make products will benefit from biotechnology.” These results indicate that the Japanese respondents’ had somewhat contradictory attitudes. It appears that they were interested in biotechnology, but cautious about the use of the technology for foods.

Genetically modified foods in the Japanese food supply are likely to be imported. Japanese consumers were asked, “How do you feel about Japan’s dependence on imported foods?” More than half (58%) felt negative about Japan’s dependence on imported foods, 16% were neutral and only 20% felt positive about imported foods. The respondents were asked to respond to a series of statements about their behaviors regarding purchase of imported foods with response categories of agree/disagree. Seventeen percent of respondents reported that they try to avoid imported foods because of the presence of genetically modified foods. Trade issues likely also are reflected in European opposition to genetically modified foods (12)

Respondents were asked to indicate their feeling about food safety regulations in Japan. Most respondents felt that the current food safety regulations were inadequate. More than 75% of respondents chose the “too lax” response regarding adequacy of regulation about dioxin contamination, bacterial and viral contamination on food, pesticide residues on food, color additives and preservatives, and genetically modified foods.

Koseisho (The Ministry of Health and Welfare) is a Japanese governmental agency that regulates health-related issues. Koseisho is also responsible for providing health-related information including food safety information to Japanese consumers. The respondents were asked if they thought Japanese government agencies, such as Koseisho, provided adequate information about food safety. Only 7% answered that they thought Koseisho usually provided adequate information.

In comparing the results of the two surveys, Washington consumers who responded to the survey tended to either hold positive opinions or be unsure of their opinion regarding food biotechnology. Japanese consumers were more likely to hold negative opinions about food biotechnology and few chose the 'don't know' response. One notable difference between the survey of Washington consumers and previous surveys conducted with American consumers is that the percentage who chose the "don't know" response related to food biotechnology questions was high - about twice that expressed by consumers in a national survey on food biotechnology conducted in 1992 (13).

Some Closing Thoughts

Consumers in many different countries appear to be uneasy about agricultural biotechnology applications. However, most of them are not making the effort to develop an understanding of the complex issues involved in making good policy decisions about genetically modified foods.

Although consumers appear to be beginning to have doubts about the widespread adoption of genetically modified crops, public opinion about food biotechnology has not yet coalesced because the adoption of the technology has moved faster than the public's ability to fully understand the process and its implications (14). The FDA reported that most participants in consumer focus groups held in March 2000 expressed great surprise that food biotechnology has become so pervasive in the U.S. food supply. The typical

participant reaction was outrage that such a change could happen without them knowing about it (15). Nelson and colleagues warned that it is risky to let technology get too far ahead of consumer acceptance (16).

The opponents of genetically modified foods have organized on an international basis and are very effectively using media and Internet to promote their point of view. A strategy that has been rather effective is picketing businesses to urge them to only purchase foods that have not been genetically modified. Some urge purchase of organic foods as a way to avoid GM foods (9).

I think that most agricultural researchers who work with genetically modified food products have been extremely surprised at the mobilization of opponents to this technology. There has also been inadequate consideration of the global nature of the food supply and that consumer opinions in Japan and Europe are extremely important to the people who market food products.

Food manufacturers are well aware of the global distribution of their products and are nervously watching American and international consumer reactions to food biotechnology. If consumers in other developed countries continue to reject GM foods, American food processors may lose these markets because it is almost impossible to obtain GM-free soy, corn, or dairy ingredients from domestic sources.

Biotechnology Education

In thinking about how to conduct education regarding food biotechnology, it may be useful to look at food irradiation because there are some similar aspects related to consumer opinion and perhaps we can learn from mistakes made by those who promoted food irradiation 40-50 years ago. For several decades, the proponents of food irradiation made many sweeping claims such as that irradiation of food would end world hunger.

When irradiation was first introduced, consumer benefits were not the primary focus since the technology was promoted as a way to extend shelf life of foods. Since American consumers have an abundant food supply, the extended shelf life was never perceived as a valid use. The early irradiation process used radioactive compounds and most of the opposition was related to an anti-nuclear viewpoint.

In the 1990's, food irradiators that use electron beams rather than a radioactive compound were developed. Consumers also greatly increased their awareness of the serious nature of foodborne illness. Since irradiation is an effective way to kill pathogens, it would seem that irradiation would easily gain consumer acceptance and the technology would now be widely used on food. However, the supply of irradiated foods is still very limited and most consumers have not yet had to make a choice of whether they will purchase these foods. Food processors are nervous about negative publicity by those opposed to irradiation and wait for other manufacturers to be the first to openly sell irradiated foods.

Research studies indicate that consumer education about the positive aspects of irradiated food is effective at encouraging consumers to try these foods. However, reminiscent of the situation with food biotechnology, most consumers are not very interested in learning more about food irradiation and the safety of irradiated foods.

Another similarity between irradiation and food biotechnology is that consumers who seek information may find it difficult to obtain materials that present a balanced

viewpoint. Many consumer-oriented materials on food biotechnology tend to emphasize risks, with limited coverage of benefits (17,18, 19). In contrast, materials written for scientific audiences tend to focus on both the benefits and risks of food biotechnology (20,21).

There is a need for well-written consumer-friendly materials that present a balanced point of view about food biotechnology. Recognizing the need for consumer outreach, CAST (the Council for Agriculture Science and Technology) developed the CAST Biotechnology Communicators program. The 50 scientists selected as Biotechnology Communicators represent most of the major disciplines in agriculture biotechnology and have been trained regarding how to reach out to the public and the media on biotechnology issues.

What role is appropriate for public policy educators in the debate about food biotechnology? There is currently much pressure to change the U. S. policies regarding the approval of agriculture biotechnology applications, and the labeling of food produced with biotechnology ingredients. Food biotechnology encompasses a wide variety of disciplines, including food safety, environmental protection, patenting of genetic materials, and corporate control of agriculture. How can you help consumers and policy-makers learn enough about the issues so that the policies they promote are the best available?

References

1. Demetrakakes P. The GMO balance. *Food Processing*. 2000;61(3):18-29.
2. Institute of Food Technologists. IFT Expert Report on Biotechnology and Foods: Labeling of rDNA biotechnology-derived foods. *Food Technology*. 2000; 54(9):62-74.
3. Hoban T, Katic LD. American consumer views on biotechnology. *Cereal Foods World*. 1998; 43(1):20-22.
4. 1999 Gap Research: Consumer and farmer opinions about food and agriculture. Conducted by Roper Starch Worldwide Inc. on behalf of the Philip Morris family of companies and the American Farm Bureau Federation. 1999.
5. Wirthlin Group Quorum Surveys. U.S. consumer attitudes toward food biotechnology. Available at <http://ificinfo.health.org/foodbiotech/survey.htm>
6. Hoban T. Consumer acceptance of biotechnology in the United States and Japan. *Food Technology* 53(5):50-53. 1999
7. Norin Gyogyo Kinyu Kouko (Agriculture, Forestry, and Fishery Finance Corporation) Shokuhin no Anzensei ni kansuru Ikou Chousa (Survey about Food Safety) Feb, 2001 Available at <http://www.afc.go.jp>
8. Heffernan JW, Hillers VN. Washington consumers' knowledge and acceptance of food biotechnology. *J of American Dietetics Assoc.* In press.
9. Linn A. Starbucks says its goal is hormone-free milk; Groups want company to use organic products. *Seattle Times*, Seattle WA. March 17, 2001; pg B6.
10. U.S. Food and Drug Administration. Voluntary labeling indicating whether foods have or have not been developed using bioengineering. Draft guidance released for comment January 2001. Available at <http://www.cfsan.fda.gov/~dms.biologu.html>
11. Toyama M. Food safety knowledge, attitudes and behaviors of residents of Kumamoto, Japan. M.S. thesis, Washington State University, 2001.
12. Hillers VN, Lowik, MRH. Incorporation of consumer interests in regulation of novel foods produced with biotechnology: What can be learned from The Netherlands? *J of Nutrition Educ* 30:2-7, 1998.
13. Hoban TJ, Kendall PA. *Consumer Attitudes about Food Biotechnology: Project Report 1993*. Raleigh NC: North Carolina State University and Colorado State University; 1993:1-36.
14. Biotech foods still a confusing subject for many. *Spokesman Review*, Spokane WA. March 27, 2001. pA8.
15. U.S. Food and Drug Administration. Report on consumer focus groups on biotechnology. Available at <http://www.cfsan.fda.gov/~comm/biorpt.html>
16. Nelson GC, Joslin T, Bullick D, Unnevehr L, Rosegrant M, Hill L. The economics and politics of genetically modified organisms in agriculture. University of Illinois at Urbana-Champaign. 1999. Bulletin 809.
17. Klee K. Frankenstein foods? *Newsweek*. September 13, 1999. pp 33-35.
18. Organic Gardening. Genetic engineering: Answers and actions. Available at http://www.organicgardening.com/watchdog/ge_reprint.html
19. Friends of the Earth. *Frankenfish. Genetically engineered fish: New threats to endangered salmon*. Friends of the Earth NW Office. 6512 23rd Avenue NW, Suite 320, Seattle, WA 98117

20. McCullum C. Food biotechnology in the new millennium: promises, realities, and challenges. *J Am Diet Assoc.* 2000;100:1311-1315.
21. IFT expert report on biotechnology and foods. *Food Technology.* 2000; 54(8):124-136.