



# Consumer Responses to GM Foods: Why are Americans so Different?

by W. Carl Hebden, Hyun Kwan Shin, and William K. Hallman

While transgenic science remains a major source of controversy around the globe, genetically modified (GM) food is everywhere in the United States. From the high fructose corn syrup in our colas to the soy protein in our energy bars, almost every processed food contains a small quantity of ingredients derived from GM crops. And while many in the food industry are not keen to label products that contain GM food, they make no attempt to hide or disguise it either. GM food is here, it has been here for a long time, and Americans consume it in large quantity – even if we do not know it.

Where GM food is concerned, the two primary differences between America and most of the world might seem to contradict. On the one hand, we are the chief producers and consumers of GM crops, and on the other hand we seem to know less about its presence in our lives than many of our counterparts living in other nations.

While Americans perform better than European and Asian consumers on quizzes about the genetic concepts behind GM foods (Hallman, Hebden, et al., 2003; Hallman, Jang, Hebden, & Shin, 2005; Huang, Bai, Pray, & Tuan, 2004; Gaskell, Allum, & Stares, 2003), Americans remain relatively unaware of agricultural biotechnology itself (Pew Initiative on Food and Biotechnology, 2005). As is frequently pointed out, less than half of Americans realize that foods containing GM ingredients are sold in supermarkets and less than one in three believe that they have personally consumed GM foods. Those who know GM foods are sold in supermarkets are also confused as to which products are on the shelf. Many seem convinced that they are eating GM tomatoes and GM chicken, neither of which is for sale in the United States (Hallman, Hebden, Cuite, Aquino, & Lang, 2004).

It is also unlikely that many Americans are aware that there is a worldwide controversy surrounding the foods they eat every day. Little more than a third of Americans

have heard of European demonstrations against GM foods, and less than a quarter were aware of the recent refusal of African nations to accept US GM food aid. (Hallman, et al., 2004).

Though Americans claim they are interested in various topics related to agricultural biotechnology, GM food has seemingly slipped from the pages of science fiction and onto our plates with little fanfare or controversy, and it remains there, largely unrecognized and unnoticed by those who consume it. Only about one in five Americans say they have discussed the topic more than once or twice with anyone (Hallman et al., 2004), a figure comparable to that of the United Kingdom, Greece, Portugal, Spain, and Belgium, though considerably less than Europe as a whole (where GM foods are conspicuously absent) and substantially less than such countries as Germany and Denmark where reported discussion is at its highest (Gaskell, Allum, & Stares, 2003).

Opinions about the application of biotechnology vary around the world, but the strongest opposition to the technology is concentrated within Europe and many Asian countries. The majority of Europeans believe GM foods are risky, not useful, and not to be encouraged (Gaskell, Allum, & Stares, 2003). Other research shows that European consumers are far less willing even to consume beef from cattle fed on GM corn (Lusk, Roosen, & Fox, 2002).

It has been suggested that European rejection of GM foods is related to fear of the unknown and avoidance of risk (Laros & Steenkamp, 2004), though Poortinga and Pidgeon (2005) have also suggested that European rejection of GM foods may be less due to risk perception and fear than the absence of tangible benefits. Indeed, Arvanitoyannis and Krystallis (2005) have found that while Greek consumer attitudes are overwhelmingly negative toward GM foods, this is not necessarily the final word on the matter, and that there are some market segments that

may be receptive to the potential benefits of GM foods. Korean consumers, who have proven to be strongly fearful of GM products, do show signs of bending under the promise of benefits (Hallman et al., 2005).

Consumer opinion is a powerful driver in governmental policy toward GM food around the globe. The response to GM foods (by both consumers and regulators) is very important for the US export market, which has lost millions of dollars due to European resistance (Pew Initiative on Food and Biotechnology, 2003). The manifestation of E.U. opposition began with an outright ban on the importation of these products and remains, opponents suggest, as a stifling labeling policy today. These policy decisions, it has been argued, may have also had a negative economic impact on the European Union (van Meijl & van Tongeren, 2004).

Similarly, U.S. agricultural exports to countries like South Korea have plummeted from several million tons of corn exported several years ago to virtually nothing today (Korean Ministry of Agriculture and Forestry, 2004) due to recently instituted GM labeling policies strongly influenced by consumer sentiment.

In addition to the European Union restrictions, countries including Australia, New Zealand, South Korea, China, Japan and others have introduced mandatory labeling policies that complicate trade with the United States which currently has no mechanisms in place to track genetically modified components from farm to fork. While it would be relatively easy to identify a shipment of grain, for instance, that is entirely composed of modified organisms, this becomes much more difficult when dealing with products that have

been mixed during shipment, are so finely processed as to remove all traces of modified DNA, or processed food products that may have been "contaminated" as a result of one of the aforementioned scenarios. The stark difference in policy between the United States and its trading partners has caused a muddled trade situation that may only become more confusing with the increasing production of GM foods and shifting international policies (Phillips, 2003).

### **Explanation of Differences**

Some literature suggests that cultural determinants play an important role in the consumer's approval of a specific technology, and that beliefs about its benefits and risks are rooted in more general knowledge and attitudes toward nature and technology and are therefore difficult to change (Bredahl, 2001). More specifically, Siegrist (1999) found that an individual's assessment of gene technology is affected by both their world view and by their perceptions of benefit and risk of the technology. Because these views are also culturally constrained, it is possible that international differences in opinion toward GM food are embedded in these cultural attitudes.

Another important influence may be related to the scale and structure of agriculture in the United States and Europe. Agriculture in the United States typically occurs on farms that are set apart both physically and psychologically from the urban centers where most of the population lives and also from the 'natural' parks and other recreational areas where those urban dwellers go 'to get away.' In the United States, farms are private property, often posted against trespass. In contrast, in many parts of

Europe, farms are much smaller and situated closer to population centers and often adjacent to or in the midst of 'natural' areas. While still considered private property, many countries have laws that permit hikers to cross agricultural lands so long as they do no harm. This structural difference may help to explain why many in Europe see what happens on farms as occurring 'in nature' and why many in America see farming as quite separate from nature.

Another important factor may be the sources in which consumers place their trust. European public opinion polls suggest that Europeans, particularly those in the Northern regions of Europe, tend to trust consumer and environmental groups while investing relatively little trust in "established" institutions such as academia and government (Zechendorf, 1998). This is important because consumer and environmentally oriented action groups tend to frame agricultural biotechnology in a highly negative light. In contrast, Americans tend to trust scientific and academic sources of information while tending to have very little trust in consumer and environmental groups (Lang, & Hallman, 2005).

These cultural attitudes toward trust can play an important role in consumers' evaluation of risk. Research suggests, for instance, that while American consumers say they would like GM foods to be labeled, they remain confident in the current policy of the FDA that does not require such labeling (Loureiro & Hine, 2004). This is consistent with the historically high level of trust American consumers have had for regulatory agencies like the USDA and FDA. Moreover, Harrison, Boccaletti, & House (2004) found that trust in regulators plays an important

role in willingness to purchase GM food.

Finally, most consumers receive information about complex scientific concepts like agricultural biotechnology through the media (Hoban & Kendall, 1993). While *how* the information about such issues is presented can be important, the mere presence or absence of an issue within the media plays a large part in public awareness and participation in that topic (McCombs & Shaw, 1972). Perhaps American consumers seem apathetic toward GM foods simply because they have not been exposed to a great deal of information about it.

The American press has not covered this topic extensively with the exception of a few "spikes" in coverage revolving around specific events (McInerney, Bird, & Nucci, 2004). The European press, however, has covered the biotechnology issues rather extensively, and this has had an effect on public awareness, opinion and policy (Durant, Bauer & Gaskell, 1998), driving European consumers to be both cognizant of the technology and wary of it. Similarly, in South Korea, where consumers know less about the science behind GM foods than Americans, awareness of the technology's existence and the issues surrounding it are superior to that of the United States, quite possibly due to greater attention by the Korean media (Hallman, Jang, Hebden, & Shin, 2005).

## Conclusion

Consumer opinion can be a powerful driver for public policy. Negative attitudes toward GM foods in Europe and Asia have caused a contentious and confusing trade situation and the loss of valuable export markets. Differences in culture, perceptions of

nature and agriculture, trust and media treatment, and the interaction between these all seem to play influential roles in consumer opinion around the world. As such, international differences in public opinion about GM foods represent a clash of cultures, politics, and policies. As the gaps between these become narrowed with increasing internationalization of trade, communications, and culture, it is unclear how much longer Americans will be oblivious to the abundance of GM crops grown in fields across the Nation or to the appearance of GM foods on their plates.

## For More Information

Arvanitoyannis, I., & Krystallis, A. (2005). Consumers' beliefs, attitudes and intentions towards genetically modified foods, based on the 'perceived safety vs. benefits' perspective. *International Journal of Food Science & Technology* 40(4): 343-360.

Bredahl, L. (2001). Determinants of consumer attitudes and purchase intentions with regard to genetically modified foods: Results of a cross-national survey. *Journal of Consumer Policy*, 24, 23-61.

Durant, J., Bauer, M., & Gaskell, G. (1999). *Biotechnology in the Public Sphere: A European Source Book*. London, UK: Science Museum Press.

Gaskell, G., Allum, N.C., & Stares, S.R. (2003). *Europeans and Biotechnology in 2002: Eurobarometer 58.0*. Brussels: European Commission.

Hallman, W.K., Jang, H.M., Hebden, C.W., & Shin, H.K. (2005). *Consumer Acceptance of GM Food: A Cross Cultural Comparison of Korea and the United States*. Forthcoming report. Food

Policy Institute. Rutgers University.

Hallman, W.K., Hebden, W.C., Cuite, C.L., Aquino, H.L., & Lang, J.T. (2004). *Americans and GM Food: Knowledge, Opinion & Interest in 2004*. (Food Policy Institute Report No. RR-1104-007). New Brunswick, NJ: Rutgers University, Food Policy Institute. Available online: <http://www.foodpolicyinstitute.org/docs/reports/NationalStudy2004.pdf>

Harrison, R.W., Boccaletti, S., & House, L. (2004). Risk perceptions of urban Italian and United States consumers for genetically modified foods. *AgBioForum*, 7(4), 195-201. Available online: <http://www.agbioforum.org>.

Hoban, T., & Kendall, P. (1993).

Consumer Attitudes about Food Biotechnology. North Carolina Cooperative Extension Service.

Huang, J., Bai, J., Pray, C., & Tuan, F. (2004). *Public Awareness, Acceptance of and Willingness to Buy Genetically Modified Foods in China*. (unpublished report – Rutgers University).

Korean Ministry of Agriculture and Forestry. (2004). *Statistic Service*. Available online: <http://www.maf.go.kr>.

Lang, J. T., & Hallman, W. K. (2005). Who Does the Public Trust? The Case of Genetically Modified Food in the United States. *Risk Analysis*, 25(5), 1241-1252.

Laros, F. J. M., & Steenkamp, J. E. M. (2004). Importance of fear in the case of genetically modified food. *Psychology & Marketing*, 21(11), 889-908.

Loureiro, M. L., & Hine, S. (2004). Preferences and willingness to pay for GM labeling policies. *Food Policy*, 29 (5), 467-483.

- Lusk, J., Roosen, J., & Fox, J. (2002). Demand for beef from cattle administered growth hormones or fed genetically modified corn: A comparison of consumers in France, Germany, the United Kingdom, and the United States. *American Journal of Agricultural Economics*, 85(1), 16-29.
- McInerney, C., Bird, N., & Nucci, M. (2004). The Flow of Scientific Knowledge From Lab to the Lay Public: the Case of Genetically Modified Food. *Science Communication*, 26, 75-106.
- McCombs, M. E., and Shaw, D. L. (1972). The agenda-setting function in mass media. *Public Opinion Quarterly*, 26, 176-87.
- Pew Initiative on Food and Biotechnology (2003). U.S. vs. E.U.: An examination of the trade issues surrounding genetically modified food. Available online: <http://pewagbiotech.org/resources/issuebriefs/europe.pdf>
- Pew Initiative on Food and Biotechnology (2005). Public sentiment about genetically modified food: November 2005 update. Available online: <http://pewagbiotech.org/research/2005update/2005summary.pdf>.
- Phillips, P.W.B. (2003). Policy, national regulation and international standards for GM foods. In: P.G. Pardey, & B. Koo (eds), *Biotechnology and Genetic Resource Policies*. (1-5). Washington D.C.: International Food Policy Research Institute.
- Poortinga, W., & Pidgeon, N. (2005). Trust in Risk Regulation: Cause or Consequence of the Acceptability of GM Food? *Risk Analysis*, 25(1), 199-209.
- Siegrist, M. (1999). A causal model explaining the perception and acceptance of gene technology. *Journal of Applied Social Psychology*, 29(10), 2093-2106.
- van Meijl, H., & van Tongeren, F. (2004). International diffusion of gains from biotechnology and the European Union's common agricultural policy. *Agricultural Economics*, 31 (2-3), 307-316.
- Zechendorf, B. (1998). Agricultural biotechnology: Why do Europeans have difficulty accepting it? *AgBioForum*, 1(1), 8-13. Available online: <http://www.agbioforum.org>.

*W. Carl Hebden is Research Analyst, Hyun Kwan Shin is Visiting Scholar, and William K. Hallman is Director, respectively, Food Policy Institute, Rutgers, the State University of New Jersey, New Brunswick, New Jersey. The research described here was supported by a grant provided to the Rutgers Food Policy Institute by the U.S. Department of Agriculture (USDA), under the Initiative for the Future of Agricultural Food Systems (IFAFS) grant #2002-52100-11203 'Evaluating Consumer Acceptance of Food Biotechnology in the United States,' Dr. William K. Hallman, Principal Investigator. The opinions expressed in the article are those of the authors and do not necessarily reflect official positions or policies of the USDA, the Food Policy Institute, or Rutgers University.*