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Have Americans Accepted **Food Biotechnology?**

American farmers are adopting genetically engineered varieties of several major commodities, including corn and soybeans. Other products of recombinant technology have been in widespread use for several years. Recombinant chymosin for cheesemaking seems to have engendered no public response, while recombinant bovine somatotropin continues to spark protest, though at a lower volume since its approval in 1993. Northern Europe, however, swarms with controversy over the acceptability of genetically engineered foods. Even chymosin has met with protest, though it is in use in some European markets, and opponents have succeeded in keeping other products off European markets at the time of this writing.

This situation has led some observers to conclude that Americans have accepted genetically engineered foods. Some go on to cite this fact as evidence that the American regulatory system has adequately regulated food safety or environmental risks that might give rise to public concern. Others simply note that cultural differences, as well as Britain's recent experience with mad cow disease, must account for food biotechnology's European reception. Both judgments presume that the American public has signaled its ethical acceptance of food biotechnology. Yet aside from the obvious fact that genetically engineered foods are being produced and eaten in the United States, there is little empirical evidence for thinking that genetically engineered foods have been accepted by Americans.

Public acceptance: what does it mean?

In a purely economic sense, acceptance is demonstrated if a product is being produced and pur-

chased on open markets. But even widespread purchase and use of a product does not necessarily mean that consumers have judged the product consistent with their values. Market acceptance of a product would count as evidence for the product's ethical acceptability only when consumers are informed and have meaningful alternatives. That is, the conditions of market exchange would have to match the requirements for informed consent.

Information must fulfill two conditions to satisfy consent criteria. First, consumers must have reasonable access to any fact that would be relevant to a purchase decision, given their broader values. Second, consumers must have the background knowledge needed to interpret the relevant facts in light of their broader values. For example, people with allergies to tropical oils can only exercise meaningful choice if they know two things: whether tropical oils are present in a given food, and whether they are at risk of an allergic reaction if the oils are eaten. Both of these conditions become complex in implementation. Does a label stating that the product "may contain one of the following: palm oil, coconut oil, peanut oil, corn oil" satisfy the criteria of information access? On the one hand, widespread use of this phrasing to limit liability and increase manufacturing flexibility (even when tropical oils are not present) may devalue the information content of the label. This limits the extent to which we can say that consumers are "informed." On the other hand, such a label does provide allergic consumers with a basis for seeking an alternative. It provides a basis for withholding consent, even if it does not provide a full basis for giving it.

Criteria of informed consent are thus only partially met in many real-world situations. In par-

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ticular, it often seems reasonable to tolerate imperfect information under circumstances when meaningful alternatives are readily available. The "may contain" label places a food-sensitive consumer in the position of accepting the risk that the offending substance will be present at levels sufficient to cause harm. As long as there is something else to eat, consuming the product anyway is evidence that the consumer has accepted the risk. The label provides a condition for "exit," or a means of withholding consent by withdrawing from any particular market exchange altogether. Since food information can be quite complex and consumer knowledge will generally be imperfect, exit becomes the primary condition for linking market and ethical acceptability, even when an opportunity for exit goes unexercised.

Neither information nor means of exit exists for American consumers whose values might be inconsistent with eating genetically engineered food. The values that might lead to this concern include religious beliefs; an aversion to novelty in foods; a concern about the social, environmental, or animal welfare consequences of genetic engineering; or a lack of trust in scientific assessment of food safety. All are values that are, in all likelihood, held by significant minorities of American consumers and that typically would be protected by more fundamental democratic principles of individual liberty, privacy, and autonomy of choice. This circumstance raises two general questions for the food industry. First, do genetically engineered foods indeed enjoy enough acceptance by American consumers to justify our current policy of providing no information or exit for consumers? Second, how should we interpret the apparent lack of acceptability for European consumers in light of the American experience?

The level of American acceptance

Given the lack of adequate information and exit criteria on the one hand, and the relative lack of overt political protest or negative press coverage on genetically engineered food on the other, we must conclude that the American public is segmented into the following groups:

Citizens who know that genetically engineered food is on the market and

1. who find it ethically acceptable.
2. who find it mildly unacceptable, hence not worthy of protest.
3. who find it seriously unacceptable but feel incapable of protest.
4. who do not know how to judge whether it is relevant to other values (such as religious di-

etary rules or general confidence in science) and would accept it if they did.

5. who do not know how to judge whether it is relevant to other values and would reject it if they did.

Citizens who do not know that genetically engineered food is on the market but

6. who would find it acceptable if they did.
7. who would protest if they did.
8. who would not protest because they don't believe it to be sufficiently important.
9. who would not protest because they feel incapable of protest.
10. who would not protest because they wouldn't know how to judge whether it is relevant to other values.



It seems likely that many who opposed rBST or who have objected to agricultural biotechnology on environmental grounds fall into either category 2 or 8. While they may be dissatisfied with the current situation, they recognize that Congress and the public at large has a limited attention span, and they have judged that there are bigger fish to fry. That judgment might change if substantial numbers of people currently uninformed about the extent of food biotechnology proved to be people who can be mobilized against it in a different political climate.

Clearly, if a large majority of Americans fall into groups 1, 4, and 6 there is little basis for concern about the status quo. However, if significant numbers fall into the other categories there are reasons to question the stability of U.S. policy for presenting genetically engineered foods to the public. There may be significant niche markets that could be exploited by specialty producers. A worse scenario might involve a serious loss of confidence in the food system that would trigger political protest and uncertainty for producers and processors alike. Unfortunately, our current understanding of American attitudes to genetically engineered food provides little basis for evaluating the situation.

There is a high degree of confusion among Americans about what the words "biotechnology" and "genetic engineering" mean, especially when applied to foods (see Hoban). Some respondents to American surveys express the belief that genetically engineered foods have been available for many years, or believe that foods such as hybrid corn, hothouse tomatoes, and "broccoflower" are genetically engineered. This suggests that ordinary survey data provide a snapshot of current American opinion that is a poor indicator of whether Americans have truly

accepted food biotechnology. Surveys yield very little basis for predicting whether a European debate on genetically engineered foods or the emergence of a charismatic (and probably conservative) public opponent of genetically engineered food could spark a backlash among American consumers.

European attitudes

The evidence suggests that many Europeans, in contrast, understand "genetic engineering" to involve transfer of DNA from organisms of one species into organisms of a different species. They understand "biotechnology" to include genetic engineering plus a package of loosely related techniques that includes genome mapping and animal cloning (Buchman; Frewer, Howard, and Shepherd). Both definitions are roughly consistent with those employed by biologists on both sides of the Atlantic. Northern Europeans also evince higher levels of general science literacy than Americans do. Though any conclusion on the matter is necessarily speculative, it is unlikely that European resistance to food biotechnology is based on public ignorance, at least when compared with the American case.

Some suggest that Europeans are more risk averse, but if so, that is less an explanation than a phenomenon calling for explanation itself. One possibility is that Americans are more comfortable in leaving risk decisions up to the individuals who will bear the risk. Many factors in American history and law could be brought forward in favor of such a view. But this view would also entail that Americans place a higher value on informed consent and on the individual's right to exit from institutional arrangements. Such an interpretation of the risk-aversion hypothesis points toward the possibility that genetic engineering represents a powder keg for the American food system, rather than an accepted technology.

An alternative hypothesis is that several events in recent European history have produced what Kahneman, Tversky, and Slovic called an "anchoring" effect. Anchoring occurs when a recent or dramatic event leads one to evaluate evidence on risk selectively. From a statistical viewpoint, anchoring biases one's estimate of risk, but anchoring is a robust psychological phenomenon. Some suggest that European attitudes toward genetic technology have been "anchored" by dramatic abuses during the Nazi era. It is also plausible that the mad cow scare has provided a recent event that makes Europeans less willing to accept new food technologies.



This second hypothesis would support a prediction that stability in U.S. markets for food biotechnology will continue and that there are no serious barriers to an expansion of rDNA techniques in other areas of the food system.

More research to inform debate

The take-home message is that we cannot be sanguine about American attitudes toward genetic engineering in the food system. The European debate over the acceptability of food biotechnology is likely to spill into the American press as it becomes an issue for trade in agricultural commodities. What we can say about American acceptance of genetically engineered food remains speculative. Whether the trade debate will be protracted and how it will affect American attitudes remain to be seen. Studies on public opinion, labeling, and market structure could improve the quality of that debate and could help the farm and food industry make the transition to food biotechnologies in an orderly and efficient fashion. ■

■ For more information

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