

Labeling Genetically Engineered Food: The Consumer's Right to Know?

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A statewide survey assessed Oregon voters' reasons for supporting or opposing a November 2002 ballot measure requiring labeling of genetically engineered (GE) foods. Of the 499 who voted on the measure, 34% supported labeling and 55% opposed it. Women, urban dwellers, and households with environmental organization membership tended to favor labeling. Reasons behind voting decisions varied widely. Consumers' right to know was a major reason for support. Cost was a major concern of the opposition. A higher percentage of those who favored labeling was "not at all likely" or "not too likely" to purchase GE-labeled food.

Key words: consumer attitudes, food, genetically engineered, genetically modified, labeling, likelihood to buy, Oregon ballot measure, organic.

Do consumers have the right to know whether the food they are buying has been genetically modified? Traditional crossbreeding has created genetically modified crops for many years. Genetic engineering now makes it possible to modify individual genes more precisely in order to grow crops with desired characteristics (Institute of Food Technologists, 2000). These genetically engineered (GE) foods began to appear in the marketplace in the mid-1990s—unbeknownst to most consumers.

Proponents of genetic modification in agriculture claim that it is a safe, valuable tool for efficiently producing more food (Jaeger, 2002). Critics claim that the safety of genetically modified foods for human health and the environment is unproven. These issues have led to questions about consumers' right to know what is in their food and how best to make this information available to them.

Labeling of biotech foods in the United States has been controversial (Korwek, 2000). Such labeling is required in the European Union and several other countries (Carter & Gruère, 2003; Jaeger, 2002; McCullum, 2000). The US Food and Drug Administration (FDA) does not require such labeling unless genetically modified products differ significantly from their traditional counterparts. Proposed FDA guidelines for voluntary labeling have not yet been finalized (Tegene, Huffman, Rousu, & Shogren, 2003). Some have suggested that voluntary labeling could increase industry credibility and consumer acceptance (Brown & Ping, 2003).

GE Labeling Issues in Oregon

Surveys have shown that consumers want genetically engineered food to be labeled (Brown & Ping, 2003;

Hoban & Kendall, 1993; Nestle, 1998). Consumers' desires to make informed decisions about food purchases have made the biotechnology food labeling issue an important public policy concern. Labeling genetically modified food presents major challenges for policymakers, however (Carter & Gruère, 2003). The state of Oregon has been in the forefront of this debate.

In November 2002, Oregonians voted on a ballot measure that would have required labeling of genetically engineered foods sold or distributed in or from Oregon (State of Oregon, 2002). Ballot Measure 27 required labels on all foods containing at least 0.1% of genetically modified ingredients. Any foods grown or distributed in Oregon for human or animal consumption were affected. The measure defined *genetically engineered* as "grown, manufactured, processed or otherwise produced or altered with techniques that change the molecular or cell biology of an organism by means or in a manner not possible under natural conditions or processes, including but not limited to recombinant DNA techniques, cell fusion, micro-and macro-encapsulation, gene deletion and doubling, introducing a foreign gene, and changing the positions of genes." Furthermore, the measure's definition of genetic engineering excluded "breeding, conjugation, fermentation, hybridization, in-vitro fertilization and tissue culture processes" (State of Oregon, 2002).

Proponents of the ballot measure (Citizens for Safe Food) argued for the consumers' right to know. They questioned whether safety to human health and the environment had been proven. Opponents (Coalition against Costly Labeling Law) raised concerns about potential costs (including the impact on farmers), as reflected in the media campaign.

The ballot measure was widely debated. Voters needed to decide whether Oregon should be the first state to require labeling of GE food, whether the time was right, and whether the ballot measure was the best way to go about doing this (Jaeger, 2002). With a 68% turnout, the measure was defeated, with 30% of voters in favor of labeling and 70% against.

Consumer Acceptance of Biotechnology

Despite widespread acceptance of biotechnology at the farm level, consumer acceptance has remained uncertain (Lusk & Sullivan, 2002). Although studies have shown that many Americans are either supportive of or neutral toward genetically modified foods, this may be more a function of ignorance than acceptance (Marks, Kalaitzandonakes, & Zakharova, 2002).

Many consumers have limited knowledge about genetic engineering or its use in agriculture (Brown & Ping, 2003). Surveys have shown that at least one quarter of Americans have not heard or read about use of biotechnology in food production (International Food Information Council, 2003; Pew, 2001b). Only 36% of International Food Information Council survey respondents (2003) knew that food produced through biotechnology was currently in the supermarket. Likewise, only 19% of Pew Initiative on Food and Biotechnology survey respondents (2001b) knew that they had eaten genetically modified food. Of the Pew respondents, 31% indicated that they would be “not at all likely” to eat genetically modified foods, and 46% felt that it was “very important” to know whether a food contains genetically modified agricultural products.

Forty-seven percent of the general population felt it is “extremely” or “very important” to have products that do not include genetically modified organisms (Sloan, 2002). Women, older shoppers, and those with children were less likely to be accepting and more likely to be concerned, according to a Food Marketing Institute/Prevention 2001 survey (Sloan, 2002). Those who placed a high level of importance on the environment were less likely to accept genetically modified foods (Lusk & Sullivan, 2002).

Lack of acceptance may stem from lack of trust. Some surveys suggest that consumers are skeptical about government’s ability to regulate biotechnology (McCullum, 2000; Nestle, 1998). Labeling genetically modified foods could function as an important tool for building trust between consumers and producers.

Organic Alternatives

It has been argued that genetically modified labeling is not needed, because consumers can now buy organic food with the assurance that it is not genetically modified. Although purchase of organic foods has been growing, there has been no uniform standard. The Organic Foods Protection Act of 1990 mandated an organic certification program for farmers and handlers of agricultural products (US Department of Agriculture, 2003). Certification gives uniformity of standards, consistency among certifiers, and reduced fraudulent practices (Montecalvo, 2001). Rules require that organic food be produced without using most conventional pesticides, petroleum- or sewage-sludge-based fertilizers, bioengineering, or ionizing radiation. The standards were finalized in 2000; compliance was required by October 2002.

Organic foods have had a recent growth rate of 20% per year and now represent 2% of the retail market (Hollingsworth, 2003). Surveys indicate that more than half of all Americans buy organic food at least one time a month (Hollingsworth, 2003) and one quarter actively seek out organic food. Organic fruits and vegetables are the main purchase category (Sloan, 2002).

The majority of consumers perceive organic foods to be safe for the environment and safer to eat. Overall, organic food users are more concerned about pollution and the environment than the general population. Two thirds of environmentally concerned Generation X supermarket shoppers consider organic foods very or somewhat important compared to 58% of Baby Boomers and 56% of Matures (i.e., those aged 65 and older; Sloan, 2002).

Consumers have a more positive attitude about organic foods than genetically modified or irradiated foods. In 2001, 64% of consumers had a very or somewhat favorable impression of organic foods compared to 21% with favorable impressions for genetically modified foods and 17% for irradiated foods (Pew, 2001b).

Survey Of Oregon Voters

To assess Oregonians’ awareness of and attitudes toward organic and GE food labeling, we participated in an annual omnibus survey conducted by the Oregon Survey Research Laboratory. The statewide random phone survey of Oregonians age 18 and older was conducted in December 2002/January 2003 to assess opinions and experience on several issues. The 801 respondents included 321 males (40%) and 479 females (60%). Their ages ranged from 18 to 96 with a mean of

48.8 years. The majority (89%) was white/Caucasian (compared to 84% white, not of Hispanic/Latino origin statewide; US Census, 2000). Ninety-two percent had graduated from high school (compared to 85% statewide) and 32% had a bachelor's degree or higher (compared to 25% statewide). Respondents lived in urban (34%), suburban (34%), and rural (23%) areas of the state and on farms or ranches (8%). Fifty-eight percent were employed, 5% were not employed, and 23% were retired. Forty-two percent had children under 18 in their homes. Their incomes ranged from over \$100,000 (9%) to under \$18,000 (13%). Seventy-two percent were the main grocery shoppers in their households; 8% had equal responsibility. In 14% of the households, someone belonged to an environmental club, group, or organization.

Seventy-six percent of respondents reported that they or someone in their households had purchased

organic food in the last six months with 22% reporting "often," 30% "sometimes," and 24% "rarely." A wide range of organic food purchases were reported, including fruits, vegetables, and dairy products.

Forty percent of respondents were aware that US Department of Agriculture National Organic Standards went into effect in October 2002. Of these, 9% reported having "a lot" of knowledge about the new requirements for labeling organic food; 40% had some. Sixty-eight percent who knew "a lot" or "some" about the new standards were aware that genetically engineered foods cannot be labeled "organic;" 53% knew that organic foods cannot be irradiated. Eighteen percent of those aware of the national standards indicated that they trusted the new organic labeling to be accurate "a lot;" 48% reported "some."

Table 1. A sample of major reasons for voting in favor of or against Ballot Measure 27 to label genetically engineered foods in Oregon.

Proponents of labeling	Opponents of labeling
"I like to know what I'm eating."	"Not cost effective."
"We should be in control of what goes in our bodies."	"Big burden to the taxpayer."
"People deserve to make an educated choice."	"Benefits don't outweigh costs."
"The public has the right to know and producers have an obligation to let them know."	"Costs too much for what it is worth."
"Other countries are doing it."	"Already enough regulations."
"They haven't done enough studies of the effects."	"There's no way you can create a bureaucracy to enforce all this."
	"We didn't need something like that."
	"Waste of money."
	"I don't think we need to spend that kind of money when the state is laying off teachers and police officers."
	"It would increase cost that would be passed on to consumers."
	"Too expensive at this time without proof that there is a problem."
	"Too much red tape for farmers."
	"Gives Oregon agriculture a negative position."
	"Oregon farmers are already in trouble financially."
	"It would have cost farmers too much money."
	"The people it was going to affect were farmers and ranchers and they were against it (the measure). I figured they needed help."
	"Unfair burden to producers."
	"I get so tired of labels. It increases the cost and doesn't serve a big purpose."
	"We have to read enough labels."
	"I don't think we have to label everything."
	"I don't really care because I don't read labels closely."
	"To get all that information in, it takes so much labeling space and I can't read those small words."
	"Not sure we can trust labeling after going through all the expense."
	"Not clearly written."
	"Too broad."
	"Too restrictive."
	"Cumbersome."
	"Issue not well defined."
	"It's a good idea but poorly written."
	"Not quite sure what the ballot measure really meant."
	"Not yet defined terms and parameters that are effective and workable."

Voter Response to GE-Labeling Ballot Measure

Eighty-seven percent of respondents were registered to vote in Oregon; 81% of these had voted in the November 2002 election that included Ballot Measure 27 (entitled “Requires labeling of genetically engineered foods (as defined) sold or distributed in or from Oregon”). Thirty-four percent reported voting in favor of labeling genetically engineered foods; 55% voted against the labeling. Others reported skipping this measure on the ballot, did not know how they voted, or refused to answer the question.

In an open-ended question, voters were asked to give the major reason why they voted the way they did on the ballot measure. Although reasons varied widely, some themes emerged (Table 1). For those who voted in favor of labeling, the consumer’s right to know was voiced by many. For some, labeling was a good idea or the right thing to do. Some expressed concern about the safety of genetically modified foods. Environmental concerns were uppermost in a few respondents’ minds.

Of those who voted against the labeling of GE foods, cost was a major concern, particularly during a time of budget crisis in Oregon. The potential financial impact of the labeling measure on farmers was mentioned by many antilabeling voters. Many voters, in general, did not think that labeling was necessary. Wording of the ballot measure was a concern to others. A few voters reported being swayed by the media campaign against the ballot measure.

Some voters felt that GE labeling should be federal rather than state-mandated: “Genetic food labeling should be in all states, so people producing food in Oregon would not be penalized in other states.” Others questioned the merits of labeling: “If people want organic foods, there are already labels there for them. If people don’t want organic food, they shouldn’t have to pay for those labels.” “It’s too late. If we had tried to enact this when most foods were not genetically altered, it would make sense to label them. But now that most are, it makes sense to label them ‘not’ genetically altered.”

How respondents voted was significantly associated with someone in the household belonging to an environmental organization (Table 2). A higher percentage of voters with household membership in an environmental organization favored labeling than those in households without such membership. Votes were also significantly associated with frequency of organic food purchases. Labeling GE food was supported in a higher percentage

Table 2. Characteristics of Oregonians who voted for and against Ballot Measure 27 requiring labeling of genetically engineered food.

	Voted for Measure 27 (n=189)	Voted against Measure 27 (n=310)
Belonging to an environmental organization**		
Yes	24.9%	13.1%
No	75.1%	86.9%
Purchase frequency of organic foods**		
Never	11.6%	25.0%
Rarely	11.6%	32.6%
Sometimes	39.5%	28.9%
Often	37.4%	13.5%
Gender*		
Male	33.2%	43.9%
Female	66.8%	56.1%
Income**		
Less than \$18,000	11.8%	8.7%
\$18,000–25,000	12.4%	6.3%
\$25,000–40,000	27.2%	19.9%
\$40,000–70,000	28.4%	30.1%
\$70,000–100,000	13.6%	21.0%
Over \$100,000	6.5%	14.0%
Residence*		
Urban	42.6%	28.5%
Suburban	27.9%	37.4%
Rural	21.6%	23.6%
Farm, ranch	7.9%	10.5%
Likelihood of buying food labeled “modified by genetic engineering”***		
Not at all likely	36.1%	19.7%
Not too likely	36.6%	27.2%
Somewhat likely	21.9%	37.6%
Very likely	5.5%	15.5%

* $p < .01$; ** $p < .001$

of households that purchased organically food “often” or “sometimes” in the past six months.

Gender was also significantly associated with how respondents voted on the ballot measure (Table 2). A higher percentage of women favored labeling. This supports previous findings that women are more likely to be concerned about genetic modification (Sloan, 2002). Income was associated with votes as well. GE food labeling was supported by a higher percentage of voters with incomes ranging from \$25,000 to \$70,000. Area of residence was significantly associated with the labeling

Table 3. Characteristics of Oregon voters likely to buy genetically labeled food.

	Likelihood of buying genetically labeled food			
	Not at all likely	Not too likely	Somewhat likely	Very likely
Purchase frequency of organic foods**				
Never	25.1%	18.9%	22.5%	22.9%
Rarely	15.2%	27.0%	28.7%	27.1%
Sometimes	25.5%	30.5%	34.0%	32.9%
Often	34.2%	23.6%	14.8%	17.1%
Income*				
Less than \$18,000	14.0%	10.2%	12.9%	14.3%
\$18,000–25,000	15.4%	12.5%	8.3%	9.5%
\$25,000–40,000	27.0%	25.5%	21.7%	22.2%
\$40,000–70,000	26.5%	23.2%	30.4%	27%
\$70,000–100,000	11.2%	22.2%	12.4%	12.7%
Over \$100,000	6.1%	6.5%	14.4%	14.3%
Gender**				
Male	33.2%	35.5%	47.4%	55.7%
Female	66.8%	64.5%	52.6%	44.3%

* $p < .01$; ** $p < .001$

vote, with a higher percentage of urban voters favoring labeling.

Likelihood of Buying GE-Labeled Food

When asked how likely they would be to buy food that is labeled “modified by genetic engineering,” 9% responded “very likely,” 27% “somewhat likely,” 30% “not too likely,” and 29% “not at all likely.” Likelihood of buying was significantly associated with voting on Ballot Measure 27. A higher percentage of those who favored labeling indicated being “not at all” or “not too likely” to buy GE-labeled food (Table 2). This suggests that labeling would influence whether consumers purchase GE food. Consumer willingness-to-pay has been shown to decrease when labeling reveals that the food has been produced with modern biotechnology (Tegene, Huffman, Rousu, & Shogren, 2003).

Likelihood of buying GE-labeled food was significantly associated with frequency of organic food purchases (Table 3). A higher percentage of those buying organic food “sometimes” were “very likely” to buy GE-labeled food. Income was also significantly associated with likelihood to buy GE-labeled food, with a higher percentage of those with \$40,000–70,000 incomes being “very likely” to buy. Gender also showed a significant association: A higher percentage of males were “very likely” to buy than females.

The Future of GE Labeling

Consumers determine the success or failure of products of biotechnology through their market behavior (Zimmerman, Kendall, Stone, & Hoban, 1994). Labeling GE food would give them an additional choice when selecting food for their families. It could function as an important tool for building trust between consumers and producers (McCullum, 2000). Benefits of such labeling could depend on information provided and consumers’ ability to interpret it (Jaeger, 2002).

Mandatory labeling requirements are not necessarily the most effective means of keeping the public informed (Shoemaker, Demcey Johnson, & Golan, 2003). It has been suggested that labeling can lead to greater confusion while reducing economic efficiency. An alternative is voluntary labeling of products that contain (or do not contain) GE ingredients.

During 2001–2002, 25 pieces of legislation in 14 states were introduced to call for either voluntary or mandatory labeling of all food products generated through biotechnology (Pew, 2001a). Legislation requiring mandatory labeling of genetically modified food did not pass. A bill authorizing voluntary labeling of foods believed not to contain genetically modified ingredients passed in Maine, however.

In 2003, Oregon legislation was introduced to prevent another ballot measure like the one that appeared on the 2002 general election ballot. Local jurisdictions and the state would have been prevented from imposing

food-labeling restrictions more stringent than those adopted by the federal government. Although this bill was not passed in the legislative session, it was another pioneering step that would have put Oregon in the position of relying on national legislation to provide uniform labeling standards for GE foods. Such national legislation may be more equitable for GE food products that are marketed across state lines.

Conclusions

Our findings confirm that many voters support labeling GE foods based on their perceived right to know what they are eating. Due to ambiguities and wide-ranging impact, Ballot Measure 27 may not have been favored by some consumers who otherwise might have supported labeling GE foods. The antilabeling campaign focused on the costs and consequences that Oregon could have incurred as the first state to require such labeling. In a time of budget crisis, cost concerns could have swayed votes against the measure.

The Oregon vote on Ballot Measure 27 suggests that the time was not right and that this particular ballot measure may not have been the best way to go about labeling genetically engineered food. Increased consumer awareness resulting from the ballot measure campaign could influence future support for labeling, however. Women, households that buy organic food, and urban consumers may be in the forefront of support.

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