Biotechnology and Provision of Consumer Information Through Labeling

The first part of this paper discusses four conclusions gleaned from a critical evaluation of the literature related to consumer information and biotechnology. The second part provides, through time, a picture of consumer perceptions, attitudes and behavioral intentions toward a single genetically modified organism (GMO): milk produced using recombinant Bovine Somatotropin. Both parts reach the conclusion that consumers play an extremely important role in determining whether the new era of GMOs will succeed, and as such should be provided with adequate information in order to make informed decisions.

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The Debate about Consumer's Right to Information

Based on the literature four conclusions about biotechnology and consumer information can be supported:

1. Anti and pro biotech groups are using propaganda like techniques to further their own position---this in many ways confuses rather than informs the public.
2. Much of the debate regarding consumer information focuses on normative arguments rather than fact.
3. Pro- and anti-biotech groups are deciding for the public the grounds on which to base their decisions in the marketplace.
4. Pro-biotech groups tend to be bottom line, profit oriented, and as such have different goals than consumers.

First, *anti- and pro-biotechnology groups are using propaganda like techniques to further their own position and this confuses rather than informs the public.* The Funk and Wagnalls New Standard Dictionary (1956) defines propaganda as "effort directed systematically toward the gaining of public support for an opinion or a course of action." Consider this definition when reading what various organizations have to say about genetically modified organisms (GMOs). One flyer, whose origin is nameless, but refers to the Center for Food Safety, alerts readers to

> "VALUE your family's health.... Avoid Frankenfoods,"

and, the Center for Food Saftey, part of the International Center for Technology Assessment asserts

> A food controversy of historic proportions is now taking place in the United States. At stake is the quality and safety of America's food supply, the health of tens of millions of consumers, the survival of the family farm, the suffering of millions of animals and the future direction of our farming and agricultural system.

On the other hand, during a hearing before the House of Representatives Subcommittee on Risk Management, Research, and Specialty Crops, statements such as the following were made:

> "Genetic Engineering and other agricultural biotechnology are among the most promising developments in modern science" (United States House, 1999), and,
>
> "The benefits that biotechnology has in store for the agricultural community and consumers can and will be far reaching" (United States House, 1999).

In addition, *The Economist* (1998) reported that in Germany, several large food producers, including Monsanto, developed a plan to include leafleting, web-site development, and materials for schools. In Austria, Noavartis planned "fireside chats." These companies involved with the development of biotechnology applications are known for their anti-label stance. On the other hand, the Center for Food Safety has also developed a leafleting campaign, warning consumers of the potential dangers of genetically engineered food. The issue of swaying public opinion *rather* than providing consumers with unbiased information on which to base purchasing decisions appears to be at the forefront here, regardless of whether the information source is pro- or anti- biotechnology.

The above discussion leads to the second point; *much of the debate regarding consumer information focuses on normative arguments rather than fact.* Of the more than 100 articles reviewed for this paper, from the variety of sources listed above, about 37% appeared to be scientifically based, and most of those dealt with food labeling in general, and not specifically biotechnology. The other approximately 63% were normatively based arguments concerning whether consumers needed to have information about biotechnology to make informed buying decisions, and questioned whose responsibility it is to provide information, if any. None of the articles are conclusive. The media, *even* when attempting to report information to the consumer, is politically charged.

For example, a *National Journal* article (Browning, 1993) provides the following quote:

> "Food processors are going to start sending us tomatoes with God knows what in them and no labels so you don't know what you're getting."

Miller, in the *Wall Street Journal* (1996), reports under the title, "A Label We Don't Need."

Consumers need unbiased information, presented in an unbiased manner if the marketplace is going to be the battleground for determining whether genetically modified organisms will be the wave of the future. Unfortunately, the reliance on propaganda and normative arguments to sway public opinion really stems from the third, and perhaps most important, point, *pro-biotechnology organizations are deciding for the public the grounds on which to base their decisions in the marketplace.*

One of the major impediments toward providing consumers with adequate information on which to make choices about whether to purchase genetically modified food is the stalemate that has developed between those who feel there needs to be more information and those that believe the only important information for consumers is that GMOs are safe according to current FDA, EPA, and USDA regulations. The President of the Kansas Farm Bureau reported at a hearing before the Subcommittee on Risk Management, Research, and Specialty Crops (1999), that

> "many consumer concerns and the views to allow imports of biotechnology products are an outgrowth of inadequate understanding or an unwillingness to comply with the scientific findings of the regulatory systems within these countries" (p. 32).

It has also been asserted that providing more information, even scientific, is useless and destructive, and will "frighten consumers away from a new technology that has the potential to lend infinite variety and choice to their diet," (Browning, 1993). Others indicate that providing scientific information on labels could erode public confidence (Miller & Huttner, 1995).

Safety, however, is only one of the myriad of characteristics of food on which consumers base their purchase decisions (Caswell, 1998; Douthitt, 1991). Caswell (1998) reports that,

> "Regulators and consumers may care about process attributes for a number of reasons. First, there may be concerns about the impact of use of the process on the final quality attributes of consumer-ready products. Second, the process may have impacts on nutrition, the environment, animal welfare, worker safety, or other important attributes."

In fact, safety is almost a "sunk cost" characteristic; if it isn't safe, it doesn't enter into the consumer's evoked set in the first place.

There are many reasons why a consumer might be interested in having information on which to base choice, including economic issues related to small scale agriculture (Marion et al., 1990; Kolodinsky, Conner, & Wang, 1997), "interference" in the natural order of things (Douthitt, 1991), perceived risk from risks as yet not uncovered by current standards (Douthitt, 1991; FDA Consumer, 1993), fairness about who derives the benefits from purchase of these goods, business or consumers (Busch, 1992), values concerning food and its social significance (Busch, 1992; Thompson, 1997), and consumer's general lack of trust in science (Thompson, 1997). Douthitt (1991) reports that, "Studies on the supply side (e.g., Fallert et al., 1987; Marion et al., 1989, 1990) have indicated the moderate to small size family farm may increasingly fail if the technology is adopted. Consumer response would indicate there is support for protecting the small family farm. Hoban (1998) found 33% of consumers felt use of rBST would be a serious problem and an additional 51% felt it would be some problem. The Wisconsin survey found that 53% of households were concerned that the introduction of rBST would have a negative impact on the small farmer with 39% indicating they were very concerned and 50% moderately concerned." By discounting the attributes by which consumers make their decisions, regardless of whether producers and some scientific groups believe that the only important characteristic is safety as defined by the current regulatory process, the market's ability to decide whether genetically modified foods will succeed is denied

Perhaps stifling consumer's ability to choose is an objective of the industry and leads to the final point, *pro-biotechnology groups tend to be bottom line, profit oriented and thus have different goals than consumers.* The literature review revealed several groups that have taken a pro-biotechnology stance. Many of these have stated

opinions in opposition to increased consumer information, in the form of labels, either regulated or voluntary. A partial list of these groups include: American Seed Trade Association (ASTA), Council for Agricultural Science and Technology (CAST), Kansas Farm Bureau, American Farm Bureau Federation, American Crop Protection Association, National Corn Growers Association (NCGA), American Soybean Association, Biotechnology Industry Association, Consortium for Plant Biotechnology Research, National Cotton Council, American Apparel Manufacturer's Association, American Cotton Shipper's Association, American Textile Marketing Association, National Cotton Council of American, and the National Cotton Seed Products Association.

These companies have a huge amount of research and development capital invested. If GMOs fail in the final consumer market, none of this capital can be recouped. Thus, there is a push toward getting GMOs to the market as quickly as possible (See, for example, Jacobs, 1999). It has also been asserted that the current regulations to test that a product is safe aid producers of GMOs in getting their products to the final market. At the current time, providing consumer information, be it on a label or otherwise, it not a priority. For example, Burstein (1997) asserts, "Monsanto and other industry giants love EPA regulation. It adds another stamp of approval to their products, and it squeezes out smaller companies that can't afford the time and money the regulatory process demands."

Differing goals of consumers and producers may finally be converging. It appears that producers may be finally getting the message that consumers have been sending all along. Roy Fuchs, Monsanto's director of regulatory science for plant biotechnology recently acknowledged, "There's a real lack of understanding of the extent of analysis we do to establish safety" (Jacobs, 1999). If there is a lack of understanding, then it is a producer's responsibility to inform the consumer. Says Gordon Conway, President of the Rockefeller Foundation, "As a result of the reaction against what they are doing and the way they are doing it, we may lose the benefits of the technology," (Jabobs, 1999). We may just be moving toward a situation where GMO producers and vendors are beginning to realize the importance of bringing consumers on board.

The four points discussed above highlight some of the general reasons why the labeling issue has come to a stalemate in the U.S. market. Moving to the more specific, there are many reasons the biotechnology industry opposes labels. For example:

> "Providing complex and confusing scientific information on food labels is not only useless but possibly destructive, biotech industry contends. Labels will only frighten consumers away from a new technology that has the potential to lend infinite variety and choice to their diet and, ultimately, to increase the worldwide food supply" (Browning, 1993).

The industry itself has asserted that it would most likely embrace labeling once aspects of GMOs that reveal direct consumer benefits are introduced. For example, currently, the benefits of GMOs flow to the producer of both the GMO and perhaps the farmer who uses these products. rBST may result in greater milk production for an individual farmer, leading to higher revenues for him or her, but no discernable benefit for consumers. They do not see lower milk prices. Bt corn results in lower current use of pesticides for a farmer, but the price of corn is not likely to change for the final consumer. On the other hand, if a GMO affords a consumer a higher level of vitamins per serving of fruit, for example, a label that touts this wonder will likely be embraced. It may be too late to wait. The Los Angeles Times reported that investors are becoming worried, the American Corn Growers Association has urged members to consider using non-genetically modified seeds next year, and exporters are asking farmers to separate genetically modified grains when they reach the silo (Jacobs, 1999).

Where Do We Go From Here?

Clearly, most of the discussion thus far has been based on normative literature. There have been scarce resources in both money and time spent on using the scientific method to explore consumer issues related to the acceptance of GMOs in their food supply. While there have been a number of studies related to labeling theory and food in general, relatively few have empirically examined labeling impacts of biotechnology in any systematic manner.

Research does reveal consumers' attitudes about products of agricultural biotechnology. Research by Grobe et al. (1996a, 1996b, 1996c) indicates that much of the consumers' concern about rBST lies in their lack of confidence in the government agencies that are mandated to regulate its use and in consumers' perceptions of the risks associated with its use. In addition, a majority of households indicate they want rBST labels (Grobe, Douthitt, & Zapeda, 1996c). However, Jacoby et al. (1977) found that while consumers say they want more information and say they are even willing to pay for it, they often do not use or understand labels primarily because they lack the

prior knowledge and context to discern the true meaning of labels. Moorman (1990), gauging the effect of the label changes after the NLEA, concludes that consumers are able to obtain more information from new labels that are more complete, more comprehensible, and less deceptive.

Caswell (1998), suggests there are four major policy options when it comes to labeling GMOs:

1. Allow no labeling regarding the use or non-use of GMOs.
2. Require mandatory labeling of products that use GMOs.
3. Allow voluntary labeling of products that do or do not use GMOs.
4. Allow voluntary labeling of products that do not use GMOs, with an accompanying disclaimer noting the government's judgement about any differences, i.e., safety, between products that use and those that do not use GMOs.

Caswell (1998) also asserts emphasis in labeling policy should be on creating competitive markets for quality attributes, such as food safety and process attributes, and providing reasonable consumer protection. However, if any voluntary labeling scheme is embraced, quality attributes that are important for consumers, may go beyond the safety issues proposed by the FDA and other regulatory agencies.

Can the issue of labeling be tested using scientific research methods? The State of Vermont is fortunate to have access to consumer data regarding one biotechnology that has been in the news for over ten years, rBST. Since 1993, the Center for Rural Studies at the University of Vermont has included questions regarding rBST on its annual Vermonter Poll. This Statewide poll includes a representative sample of approximately 400 registered voters every year. All years of data (1994, 1995, & 1999) were collected to have a confidence rating of 95/5. That is, we are 95% confident that answers to the questions asked are within 5% of the true answers the Vermont population as a whole would give. The 1994 data set contains responses from 481 individuals; the 1995 data set contains responses from 696 individuals; and the 1999 data set contains responses from 553 individuals. In reaching a representative number of consumers, random digit dialing and up to five callbacks were made. A comparison with the 1990 U.S. Census indicates that the sample is representative of Vermont's population for the socio-demographic characteristics included in this study (age, income, gender, education, and urbanization).

For this study, a use three years of data to help identify how consumer perceptions of rBST have changed. Vermont is also unique in that it has experienced two of Caswell's (1998) suggestions about labeling: require mandatory labeling of products that use GMOs and allow voluntary labeling of products that do or do not use GMOs. Figure 1. shows how individual reactions to whether or not they would purchase milk produced with rBST. There was a 20% increase in the number of individuals expressing that they would not purchase milk produced using rBST from 1994 to 1995. The percentage grew another 30% between 1995 and 1999. Thus the majority of consumers have expressed an interest in being able to purchase rBST free milk.

Because there is no discernable distinction between milk produced using rBST and milk not produced using rBST, the only way for consumers to be able to ascertain the production method used is to label the product. Figure 2 shows the percentage of consumers who expressed an interest in having dairy products that were produced using rBST labeled as such.

Figure 1. Percentage of consumers who would not purchase milk produced with rBST.

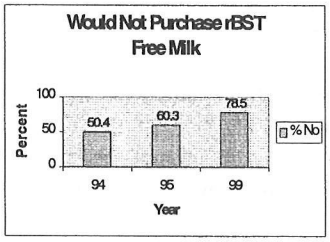


Figure 2. Percentage of consumers desiring labels on milk produced using rBST.

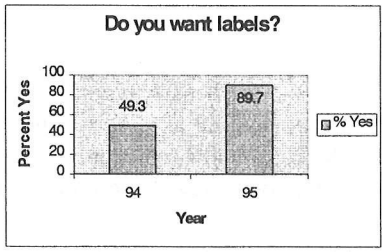


Figure 3. Percentage of consumers who Want labels by who would buy rBST free milk.

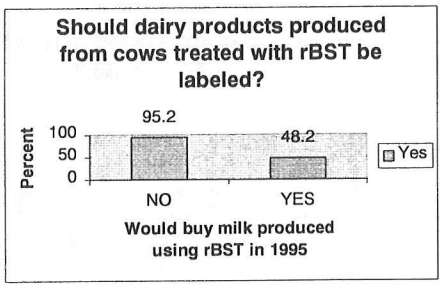
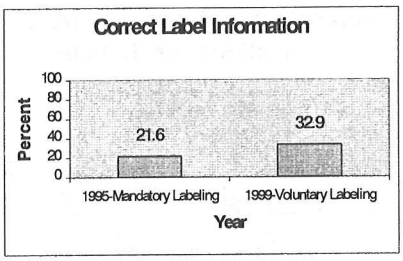


Figure 4. Percentage of consumers obtaining the correct information from rBST labels.



Individuals express an interest in purchasing rBST free milk, and interest in seeing a label on dairy products. The next question is, "is there a relationship between wanting a label and having an interest in milk produced using rBST? Figure 3 indicates that significantly more individuals who would not purchase milk produced using rBST were in favor of labeling. Interesting to note that those who would purchase milk produced using rBST were split on the labeling issue.

It was this sentiment toward labels that prompted the State of Vermont to initiate a mandatory labeling law in 1994. By 1996, the mandatory labeling law was repealed and producers who DID NOT use milk produced using rBST were permitted to label their products as such. Figure 4 identifies the percentage of consumers who understood the meaning of the mandatory (1995) versus voluntary labels (1999). Note that the mandatory labels contained NO information, they were simply a blue dot. Information about the labels was available elsewhere in the store. The voluntary labels have a variety of information, ranging from simply, "rBST free," to, "We oppose Recombinant Bovine Growth Hormone. The family farmers who supply our milk and cream pledge not to treat their cows with rBGH. According to the FDA, no significant difference has been shown, and no test can now distinguish between milk from rBGH treated cows and untreated cows." Thus, the voluntary labeling scheme seems to be providing more understandable information to consumers. Still majority of consumers do not obtain the correct information.

Moving on to another question, Is there a relationship between those who wanted to purchase rBST free milk and those who obtained the correct information from the labels? Figure 6 highlights three things. First, more consumers who expressed a desire to purchase rBST free milk obtained correct information from the labels in both 1995 and 1999. Second, more information was obtained under the voluntary labeling scheme. And, third, the majority of consumers continue to not obtain correct information from labels. Overall, the voluntary labels are reaching more individuals who are using them to identify the GMO free attribute of milk.

Labeling does not come without a cost. If consumers desire labels, then the cost of, not only labeling, but of record keeping must be borne by someone. In the case of rBST, farmers must sign affidavits that their milk is produced without using the synthetic hormone. Are consumers willing to pay for this attribute? Figure 7 highlights that not only are more consumers willing to pay for the rBST free attribute in 1999 compared with 1995, they are willing to pay a higher premium level. In 1995, the average price of a gallon of milk in Vermont was $2.00. Only 8.2 percent of consumers were willing to pay $.40 or more a gallon for milk labeled rBST. In 1999 the average price of a gallon of milk was $2.50. 29.8% of consumers indicated they were willing to pay $.50 or more for a gallon of milk labeled rBST free.

Figure 6. **Percent of Consumers who** obtained the correct information by whether or not they would purchase rBST free milk.

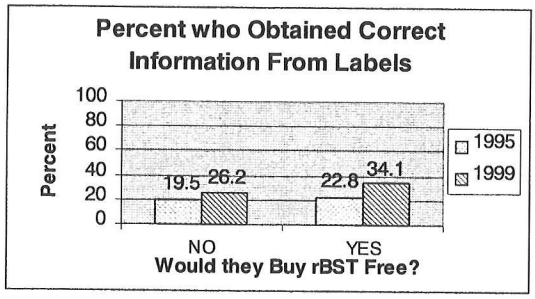
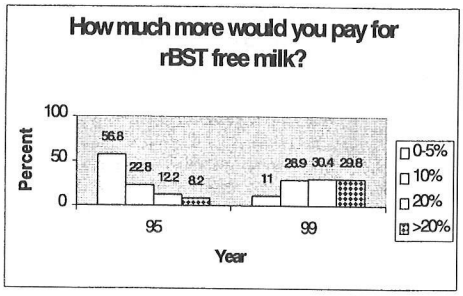


Figure 7. **Percentage of consumers in 1995** and 1999 who are willing to pay a premium for rBST free milk.



Clearly, the evidence over time from a single state on a single GMO issue indicates that consumers want to be able to choose products based on process attributes and that they would like to see products labeled as such. They even state a strong willingness to pay for the information. In addition, it appears that of Caswell's (1998) labeling scheme choices, a voluntary labeling scheme works better than a mandatory labeling scheme, at least in the case of one State that has tried both. It remains to be seen whether sellers of genetically modified organisms or sellers of more traditionally produced products are the winners in the marketplace. Whatever the outcome, consumers express a strong desire to be players in the marketplace.

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Endnotes

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