jrc Journal of Research for Consumers
Issue: 13, 2007

Consumers and the Case for Labeling Genfoods

AUTHOR(S): Shahin Berenji

ABSTRACT

Since the mid-1990s, Argentina, Canada, and the United States have surreptitiously introduced genetically engineered food crops in their domestic as well as international markets. Despite the many health uncertainties surrounding these products, the aforementioned countries have not subjected their genfoods to either mandatory safety tests or labeling requirements. Consequently, consumers in these countries have not only been exposed to potentially unsafe food but they have also been unable to differentiate GE from non-GE foods, making it increasingly difficult for them to exercise food choices in accordance with their health, religion, morals, culture, and political views. This regulatory framework, in particular the anti-GE labeling policy, violates a myriad of ethical imperatives that place an onus upon governments to protect the integrity, autonomy, and health of consumers. Given the gravity of this violation, the author argues that the Miami Group countries should label products of agricultural biotechnology.

ARTICLE

Introduction

For more than ten thousand years, humans have modified the genetic traits of crops by selectively breeding the most nutritious, resilient, and disease/pest resistant plants.[1] Through this simple form of agricultural biotechnology, farmers naturally "engineered new combinations of genes" to produce superior plant stocks (Teitel and Wilson 1999, pp. 12-14).[2] However, because undesirable traits were frequently passed along with the desirable traits, this traditional technique required successive generations of plant breeding, making it relatively slow, demanding, and uncontrollable. With the advent of new biotechnologies such as genetic engineering in the late 1980s, these drawbacks were suddenly removed. Utilizing

[1] Selective Breeding: This is a general term that refers to various kinds of breeding techniques, including, but not limited to, hybridization (breeding domestic crops with their wild relatives so that it can inherit the strong traits of the latter organism) and cross-breeding.

[2] The Convention on Biological Diversity (CBD) defines biotechnology, broadly speaking, as: "any technological application that uses biological systems, living organisms, or derivates thereof, to make or modify products for a specific or practical use…" *See* the Convention on Biological Diversity (Article 2), *available at* http://www.cbd.int/convention/articles.shtml?a=cbd-02.

recombinant DNA technology, genetic engineering extracts a known, specific trait from a living donor organism (plant, human, animal, bacteria, or microbe) and splices it into a recipient organism's preexisting DNA.

With this novel technology, food producers were finally able to modify the genetic makeup of organisms "precisely and predictably, creating improved plant varieties faster and easier than…traditional techniques" (Henkel 1998). Since its application to agriculture in 1993, food crops have acquired the necessary genes to: resist diseases/pests, tolerate drought conditions, increase shelf life, and obviate or reduce the use of herbicides (weed-killers) and pesticides.[3] By reducing excessive reliance on water and chemical agents, the proponents of genetic engineering have touted this technology as a means to protect the environment. More importantly, in maximizing agricultural yields, genetic engineering has universally been hailed as a panacea to end global hunger, malnutrition, and food insecurity. Speaking of its great promise and potential, Norman Borlaug, a renowned Nobel-laureate, posited that the application of genetic engineering to agriculture enables growers "to feed the population of 8.3 billion that will exist in 2025" (Bailey 2000).

In spite of its benefits, there is as much opposition to the science as there is support. In recent years, critics have voiced extrinsic or consequentialist objections that such foods pose uncertain, and perhaps unknown, risks that may seriously threaten human health, animal welfare, biodiversity, and environmental safety. In addition, many other critics and consumer advocates have expressed intrinsic or integrity-based concerns that genetically engineered foods, even if proven safe, are incompatible with the fundamental values and beliefs of certain individual moral agents or groups (Pascalev 2003).

Despite these significant objections to genfoods, the governments of Argentina, Canada, and the United States have not regulated these products any differently from their unmodified parental strains.[4] In these countries, collectively called the Miami Group, transgenic crops are not subjected to any mandatory safety tests or labeling requirements; they are evaluated, marketed, and introduced akin to traditional foods.[5] Such a method of regulation not only exposes the public to potentially unsafe food but it also withholds crucial information from consumers, hindering their ability to differentiate GE from non-GE foods. Unable to distinguish the former from the latter, consumers are finding it increasingly difficult

[3] In 1993, Calgene (a biotech company) introduced the Flavr Savr tomato on the market. This tomato was engineered to inhibit the expression of a gene that normally causes fruit to soften. By delaying the ripening process, the fruit stays firm longer (Diouf 2001).

[4] Hereafter, genetically engineered food may also be called genfood, GE food, or transgenic crops; in other literature, it may not be uncommon to see genetically engineered foods called genetically modified foods (GMFs) or genetically modified organisms (GMOs).

[5] In most literature, "Miami Group" refers to the powerful bloc of GE-producing countries - Argentina, Australia, Canada, Chile, the United States, and Uruguay – who advocate the free flow of agricultural commodities, particularly transgenic crops, in international commerce. The Miami Group is an organization of like-minded countries who promote their economic interests (the marketing of transgenic crops) by organizing themselves into a single political bloc. As a matter of policy, the Miami Group opposes the international regulation of genetically modified foods because they believe this would violate the sacrosanct principle of free trade (Duall 2004; Devonchik 2000).

As used in this paper, however, "Miami Group" will only refer to Argentina, Canada, and the United States, the leaders of this six nation bloc (please note, these countries are often referred to as the "triumvirate"). Aside from their opposition to international regulation, these three countries strongly oppose regulating GE foods in their domestic or home markets. And so, for the purpose of simplicity, the author has borrowed this term to group the aforementioned countries on the basis of their domestic regulation (or rather lack thereof) of transgenic crops. The focus of this paper will be mainly on the United States and Canada.

to make food choices that comport with their health, religion, culture, morals, and political views.

By threatening the concerns, beliefs, and/or values of people, the Miami Group's regulatory framework, in particular the anti-GE labeling policy, violates a myriad of ethical imperatives that place an onus upon governments to protect the integrity, autonomy, and health of consumers. Given the gravity of this violation, it is argued here that the Miami Group countries should communicate important product-related information (such as whether a food item has been genetically engineered) to their consumers by labeling products of agricultural biotechnology.

Background

GE Foods and Health Concerns

The risks posed by transgenic crops are emblematic of the hazards and dangers that often accompany scientific and technological innovation. Similar to the other risks induced and introduced by modernization (i.e. air and water pollution, nuclear disasters/accidents), the risks of GE foods are "localized in a sphere of physical and chemical formulas," meaning they are largely invisible and imperceptible to consumers (Beck 1992, p. 21). Although scientific experts have the technical knowledge to evaluate the dangers of transgenic crops, the non-localized nature of the risks in addition to the unknown long-term effects of GE food consumption has reduced the overall efficacy of traditional risk assessments. Because scientists are still debating the safety of GE foods, consumers have remained wary about accepting these products. The L-trytophan and later the Starlink scare, described below, only reinforced fears that transgenic crops may place the health and well-being of consumers at great risk.

In 1989 and 1990, a genetically engineered brand of L-trytophan, a common dietary supplement used to treat depression and insomnia, killed more than thirty-seven Americans and permanently disabled or afflicted more than five-thousand others with a fatal and painful blood disorder known as *eosinophilia myalgia* syndrome (EMS). Although one may question the applicability of this example since it deals with a genetically engineered drug, not a genetically engineered food crop, it still demonstrates the inherent dangers in marketing genetically engineered products (Cummins and Lilliston 2000).

In a more recent case, thirty-seven American consumers reported allergic reactions to Starlink - a genetically modified corn seed that produces Cry9C, an insecticidal protein (Strauss 2006a; Zepeda 2001). The potential of transgenic crops to cause allergic reactions was verified in a 1996 study in the *New England Journal of Medicine* (NEJM) where researchers found that the transfer of DNA from one organism to another can turn a nonallergenic food into an allergenic product. In the study, scientists specifically looked at how Pioneer Hi-Bred International, an Iowa-based biotech company, sought to change the protein content of its soybeans by adding a gene from the Brazil nut. When researchers tested the genetically engineered soybeans on individuals with allergies to Brazil nuts, they found it triggered a similar allergic reaction. Although the product was removed from the market before any fatalities or injuries, "'the next case could be less ideal and the public less fortunate,'" said Marion Nestle, head of the nutrition department at NYU (Grogan and Long 2000, pp. 45-47). Thus, the allergenic reactions from Starlink are not an exception to the overall safety of GE foods; on the contrary, they illustrate the fact that genfoods may contain

"hidden allergens". In countries such as the United States where almost twenty-five percent of consumers report that they or members of their families suffer from food allergies or sensitivities, transgenic crops thus pose a significant health risk.

Apart from allergenicity, the transfer and splicing of DNA produces what scientists call pleiotropic or unpredictable side effects. These side effects arise from the simple fact that genes are interactive and interdependent entities, which means that the insertion of a new gene may interfere with the function and activity of neighboring genes. This was verified in 1990 after German researchers spliced a gene for the color red into 20,000 white petunia flowers. Not only did the genetically engineered petunias turn red, but they also had more leaves and shoots, a higher resistance to fungi, and lower fertility, all of which were completely unrelated to the inserted gene. And so, the German study raises new questions about the safety of transgenic crops since the insertion of a new gene may unpredictably affect their protein composition, hormonal expression, nutrient or anti-nutrient composition, toxicity, allergenicity, etc. Without proper safety tests, it is virtually impossible to check for the significant and unexpected changes that arise from the process of genetic engineering (Cummins and Lilliston 2000; FDA 1992; Steinbrecher 1998).

Lastly, genetically engineered food may be unsafe because of its potential to exacerbate the already serious problem of antibiotic resistance. To simplify the process of genetic implantation, genetic engineers use antibiotic marker genes to see if the new genetic material has been successfully transferred to the cells of the host organism. If these antibiotic marker genes are introduced on a large scale into the food supply, many scientists fear that antibiotics could soon be rendered useless in fighting diseases and infections (FDA 1992). For this reason, in 1998, the British Royal Society, recognizing this future danger, urged governments to ban the use of marker genes in agricultural biotechnology. Unfortunately, this recommendation was not taken seriously either by biotech companies or biotech producing countries (Grogon and Long 2000).

While allergenicity, pleiotropic effects, and antibiotic resistance are the most commonly cited concerns, they represent the "tip of the iceberg" of possible safety risks posed by genetically engineered foods. A study by Dr. Samuel Epstein, reported in a 1996 article in the *International Journal of Health Services* warned that milk and dairy products produced from cows injected with Monsanto's controversial genetically engineered bovine growth hormone (BGH) contained significantly higher levels of a potent chemical hormone, Insulin-Like Growth Factor (IGF-1). This hormone, when present at high levels, places humans at great risk for breast, prostate, and colon cancers. Although this study did not deal with transgenic crops, the focus of this article, it illustrates the point that GE food products can increase the likelihood of life-threatening diseases (Cummins and Lilliston 2000; Grogan and Long 2000; Leiss 2004).

Recently, a number of scientific studies established a link between transgenic crops and cancer, birth defects, and other important health problems. Given that many genetically modified plants are herbicide-resistant, growers can now use super-potent, broad spectrum herbicides such as glyphosate (popularly called Roundup), glufosinate, and bromoxynil without killing their crop. However, the natural adaptability of weeds in addition to the cross-pollination of wild plants by herbicide tolerant crops has resulted in the creation of superweeds (Grogan and Long 2000; Steinbrecher 1998). These herbicide resistant weeds, in turn, have forced farmers to apply additional herbicides and/or increase herbicide rates of application. Thus, contrary to the proponents of biotechnology, GE crops have actually helped perpetuate the paradigm of heavy chemical use in agriculture. According to a recent

report by Dr. Charles Benbrook (2004), between 1996 and 2004, farmers used 138 million more pounds of herbicides on GE varieties (particularly on corn, cotton, soy) than on conventional ones.

As plants typically absorb the residues of herbicides, consumers are now ingesting the chemicals of these potent, over-used agents. This has raised numerous alarms because in a 1999 article in the medical research journal *Cancer*, foods with residues of glyphosate, the main ingredient in Monsanto's Roundup herbicide, were reported to place consumers at risk for non-Hodgkin's Lymphoma, a type of cancer. Although other possible health effects were also reported such as birth defects and damage to human blood cells, cancer was the most worrisome effect. This is especially disturbing in light of the fact that Monsanto and other biotech companies estimate that herbicide-resistant crops planted around the globe will ultimately triple the amount of toxic, broad-spectrum herbicides used in agricultural production (Cummins and Lilliston 2000; Steinbrecher 1998).

The dangers associated with GE foods lend support to the "risk society" thesis of the German sociologist Ulrich Beck. In his book *Risk Society: Towards a New Modernity* (1992), he argues that the risks of contemporary society are inextricable, irreversible, and irreparable. These characteristics of modern risks, as apocalyptic as they may seem, are entirely relevant to the GE debate. For instance, if consumers reported antibiotic resistance, allergic reactions, cancer, birth defects, or other conditions resulting from GE food consumption, it would be almost impossible for governments to remedy these problems since they can "only be minimized…they can never be removed entirely" (Beck 1995, pp. 76-77). To prevent or avoid these risks, governments should subject transgenic crops to thorough premarket safety tests. However, while safety tests may provide information on the short-term effects of transgenic crops, they cannot ascertain all the long-term effects resulting from GE food consumption.

Given the uncertainty surrounding the safety of GE foods, "everyone is caught up in defensive battles of various types, anticipating the hostile substances in one's manner of living and eating" (Beck 1994, p. 45). As argued by Beck, the ability to shape one's destiny through self-determination is central to dealing with the dangers of a "risk society". However, the absence of GE labels in the Miami Group countries has prevented consumers from formulating individual responses to the risks of transgenic crops. Without such labels, consumers cannot differentiate GE from non-GE foods, thus hindering their ability to make food decisions in accordance with their health concerns.

The Miami Group and Substantial Equivalence

The Miami Group's domestic regulation of GE food was born in the United States more than twenty years ago when a working group convened by President Reagan's Domestic Policy Council published a significant policy document, "Coordinated Framework for Regulation of Biotechnology". In this paper, the executive branch established the fundamental premise that modern genetic engineering did not *ipso facto* warrant any more regulation than traditional genetic modification techniques such as hybridization (Kysar 2004; Strauss 2006b). This policy was later advanced in the FDA's (Food and Drug Administration) 1992 statement that genfoods, in most cases, are "substantially similar" to unmodified foods and as such, they do not require any special regulation.

Thus, the FDA presumes that if major changes in general usage, physical features or characteristics, nutritional content, and toxicity cannot be discerned, then the new food or

food component can be considered substantially equivalent to the food it is meant to represent. Under the substantial equivalence doctrine, ongoing scientific uncertainty with respect to the risks of transgenic crops is insufficient to warrant regulation. In effect, then, "products of agricultural biotechnology are assumed to be innocent until proven guilty" (Clapp 2005, pp. 474-475).

Using this policy as its basis for regulating products of agricultural biotechnology, the FDA conferred GRAS (Generally Recognized as Safe) status on those crops that were deemed substantially equivalent to their traditional counterparts; automatically exempting them from premarket review or safety tests. In line with this rationale, the FDA did not subject GE crops to special labeling requirements. According to the FDA, the genetic modification of agricultural products did not constitute "material" enough information for it to be subject to mandatory disclosure (Kysar 2004; Pew Initiative 2001). Although the FDA gave food producers the option of labeling their products as "genetically engineered," they have chosen not to voluntarily label their products for fear of a negative consumer reaction (Krimsky and Murphy 2001).

The FDA's regulatory policy, which has come to be known simply as substantial equivalence, was formally described by the OECD (Organization for Economic Cooperation and Development) in 1993 (Pouteau 2002). Shortly after its introduction in the international arena, a number of nations began emulating the US model of genfood regulation by adopting the substantial equivalence doctrine. Currently, it is a concept endorsed by various countries around the world, including, but not limited to, Argentina, Australia, Canada, Chile, South Africa, Japan, New Zealand, the Philippines, and Uruguay (Sheldon 2002; Council for Biotechnology Information 2001; Gruere 2007).

However, while the substantial equivalence (SE) designation is enough to help the Miami Group to avoid regulation, other countries interpret the doctrine to be no more than a starting point for the assessment of genfoods. And so, in most other countries, substantial equivalence is used as one way, among others, to identify similarities and differences between a GE food and its non-GE counterpart. It is not merely a coincidence that the different interpretations of SE are closely related to the agricultural economy of the country in question. In those nations where agricultural biotechnology has grown exponentially and become an integral part of the economy, substantial equivalence has been invoked as the only necessary policy to regulate genfoods. This is true for Argentina, Canada, and the United States since they constitute some of the largest growers of transgenic crops. According to the International Service for the Acquisition of Agribiotech Applications (ISAA), the US represents 60% of the global transgenic crop area; Argentina, 20%; and Canada, 6-7% (Zarrilli 2005). Thus, the broad and vague nature of substantial equivalence allows this principle to be interpreted to suit the needs and motives of various countries. For the members of the Miami Group, it can help them avoid stringent regulation while for other countries it may provide a stepping-stone to further regulation.[6]

In recent years, the Miami Group's interpretation and application of this doctrine has also influenced the way other nations have regulated GE foods. As importers of food, developing countries like Singapore and Sri Lanka are predominantly dependent upon foreign nations, especially the US and Canada, for their food supply. If either Singapore or Sri Lanka decided to regulate the genetically engineered foods entering their country (either through safety

[6] It is important to note that all the references made to substantial equivalence herein will only refer to its usage by the Miami Group.

tests or labeling requirements), they would risk a trade row with their most important trading partners. And so, the perception of a possible trade row has deterred both countries from doing so. This necessary reliance on food imports, especially from the US and Canada, is the main reason why some developing nations have maintained a favorable policy towards biotechnology despite their deep reservations (Akech 2006; Newell 2006; Oriola 2002).[7]

Besides governments, this doctrine has also been incorporated into the policies of many influential organizations, including the United Nation's Food and Agriculture Organization (FAO), the World Health Organization (WHO), and the World Trade Organization (WTO). Even more importantly, the Codex Alimentarius Commission (or Codex), the most important international body responsible for setting food standards, has recognized the use of SE as a legitimate form of risk assessment.[8] The widespread approval of substantial equivalence illustrates the extent to which it has become a globally accepted principle (Pouteau 2002).

In spite of its international recognition, certain criticisms have been directed at substantial equivalence and its ability to evaluate the safety of genetically engineered foods. Most of these criticisms have focused upon the way in which substantial equivalence judges the safety of novel foods by simply comparing them with their unmodified parental strains. During this comparison, if GE foods are deemed substantially equivalent to those foods they are meant to represent, they are assumed to pose similar risks. This assessment is extremely artificial since it falsely presupposes that "substantially equivalent" GE foods pose the exact same risks as traditional foods (Pouteau 2002). Even if one accepts this implicit assumption, the way in which foods have been compared to establish substantial equivalence has been superficial and vague. More often than not, these comparisons have only noted changes in physical features or characteristics, composition, and nutritional content, an insufficient basis to help structure a real safety assessment. Lacking any scientifically proven evidence (i.e. results from toxicity, allergenicity, or chemical tests), safety is merely inferred largely from "assumptions-based reasoning with little or no experimental validation" (Pouteau 2002, p. 292). It is for this reason that critics of substantial equivalence such as Clark and Lahman (2001, pp. 3-5) conclude that it is a "dubious assessment based off analogy".

Another criticism of substantial equivalence is that its application is limited upon the existence of a comparator. Without a comparator, substantial equivalence has no way to establish the safety of a novel food. This has not been a problem thus far since all the novel foods to date have been the result of incorporating (or selecting for) one or two rather simple single-gene traits. The next generation of genetically engineered products, however, is much more complex since they have been engineered or "bipharmed" to produce vitamins, drugs, vaccines, and nutraceuticals in addition to the desirable plant traits (MacLaughlin 2003; Oriola 2002). For these products, it will be much more difficult to find appropriate comparators since these plants will be so much different than their non-modified counterparts. In this context, then, conducting a safety assessment via substantial equivalence might be very unsafe.

[7] Sri Lanka actually imposed a ban in 2001 on the introduction and sale of genetically modified foods. However, this ban was removed indefinitely because of significant lobbying pressure from the United States and Canada (Center for Food Safety 2006a).

[8] Codex – A subsidiary body of the FAO and WHO; it currently represents more than 95% of the world's population.

Ethical Concerns: Why GE Food labeling is needed

Without comprehensive safety testing, there is no way to conclusively ascertain the dangers associated with these products. Like the subjects of medical research, consumers are part of an on-going experiment which may pose considerable risk to their health. However, while their circumstances may be identical, the procedure or rules guiding each experiment seems to be completely different. Unlike food producers, medical researchers usually provide information to their subjects so that they can give informed consent. This principle, important as it is for any experimental design, is currently absent from the GE regulatory regime of the Miami Group countries (Rich 2004). The assumption here is that through labeling, food suppliers discharge some of their ethical responsibilities by providing consumers information so that they can avoid potentially unsafe food products.

Labeling theoretically allows those consumers who have qualms and concerns about genfoods to withhold consent and exit the GE food market altogether. In this way, labeling protects the “exit rights” of consumers in that it allows them to avoid the GE market if they do not wish to consume transgenic crops (Thompson 1997; Burgess and Walsh 1999; Thompson 2000). If one accepts this presupposition, the anti-GE labeling policy is unethical since consumers are buying and consuming potentially harmful food without their knowledge and without their choice. By withholding crucial information, Argentina, Canada, and the United States have made their consumers unknowing and unsuspecting subjects of a food experiment with uncertain health effects.

While the crux of the argument calling for labeling has focused on the need to make consumers aware of the possible health risks associated with GE consumption, this has raised the inevitable question- would labeling be absolutely necessary if GE foods were ultimately proven to be safe? Even if food safety was no longer a concern, the current regulatory regime would still be unethical since it would violate the principle of “consumer sovereignty”.

Consumer sovereignty, a term coined by William H. Hutt (1936), is a very broad concept premised upon the belief that the integrity and autonomy of consumers should be respected in all market transactions. In order for this to happen, consumer sovereignty requires that sufficient information be made available to consumers so that they can exercise food choices consistent with their deeply held beliefs and/or values. In this respect, consumer sovereignty is significant because it does not condition food information simply upon the possibility of harm. On the contrary, information is obligatory, regardless of the product’s safety, so that individuals can make decisions compatible with their identity and lifestyle (Burgess and Walsh 1999; Kysar 2004; Thompson 1997).

In the context of food consumption, this concept is very germane because food items are often imbued with meanings of great significance. These meanings or “symbolic charges” shape how cultural, ethnic, and religious groups define food, or “items acceptable for human consumption,” and what they perceive to be edible/inedible (Beardsworth 1997, pp. 51-52). In addition to providing nutritional benefits, consuming food is an essential way in which people maintain and assert their collective as well as their individual identity (Beardsworth 1997; Mennell 1992).

The absence of GE labels makes it hard for consumers to purchase and eat foods prescribed by their group affiliation since they cannot differentiate GE from non-GE foods. Without any distinction between the two types of food, it is virtually impossible for consumers

to exercise food choices according to "their conception of the good life" (Pascalev 2003, p. 588). Thus, the Miami Group's anti-GE labeling policy violates consumer sovereignty in that it hinders the ability of consumers to act according to their beliefs.

In particular, members of religious groups have found it quite difficult to practice their faith amidst the homogenizing effects of the anti-GE labeling policy. As a whole, religious groups usually oppose modern agricultural biotechnology for two reasons: their beliefs and dietary rules. Firstly, they oppose the movement of genes in and between different species for they feel this violates God's handiwork and subsequently implies an arrogance or unwillingness to recognize humanity's limits (Thompson 1997). From the perspective of these religious groups, such world-changing powers as genetic engineering should naturally be left to God alone. Secondly, many religions have dietary laws that proscribe certain foods or the eating of foods in certain combinations (Thompson 1997). Thus, genetic engineering complicates their dietary laws because it inserts foreign DNA, or DNA from plants, animals, insects, and even humans, into food crops. To illustrate some very extreme cases:

- Arctic flounder genes have been inserted into tomatoes, strawberries, and other cold-sensitive plants to give them frost-resistance (McHugen 2000)
- Bt (Bacillus thuringiensis, a bacterium that makes insecticidal chemicals) genes have been inserted into tomatoes, tobacco, corn, cotton, and potatoes to produce pest resistant varieties (McHugen 2000; Oriola 2002)
- In the United States, a California-based biotech company has recently engineered rice with human genes to produce proteins found in breast milk and saliva (Weiss 2007)
- In Japan, scientists introduced three kinds of pig cytochrome P450 genes into the rice plant "Nihonbare" to give it herbicide resistance (National Institute 2002)

For Muslims and Jews, commercialization of the last food product would violate their religion since both faiths have dietary laws prohibiting the consumption of pork. As indicated by this example, the fact that genetically engineered foods go unlabeled makes it increasingly difficult for religious groups such as Muslims and Jews to exercise food choices that comport with their deeply held beliefs.[9] In this way, genetically engineered foods may interfere with the ability of individuals or groups to freely exercise their religion.

However, religious groups just serve as one example among many others of how consumer sovereignty has been violated by the absence of food labels. For instance, because the strawberries or tomatoes mentioned above are not labeled, it is impossible for cultural groups such as vegans and vegetarians to practice their belief in not consuming animals or any components of animals. In the same vein, as food consumption is often understood as an expressive act that may be influenced by one's political, moral, and ethical viewpoints, one could equate food consumption with expression. Without labels, the ability of consumers to express themselves is suppressed since they can no longer make food choices to indicate their approval and/or disapproval of a product and the methods or processes used to create it. While many individuals consider this only a trivial matter, coercing individuals or groups to consume foods inconsistent with their beliefs jeopardizes their very identity and existence (Pascalev 2003).

But apart from restricting information, the anti-GE labeling policy is also unethical because it goes against what Rubel and Streiffer (2005) call "citizen autonomy". This is an important

[9] Although "Nihonebare" Rice has not yet been marketed to the public, it may be introduced in the future.

part of consumer autonomy and it is based on the Rawlsian view that the political autonomy of citizens favors the making of collective decisions - such as whether or not to label GE foods- in accordance with the majority's will. Consequently, if the majority of citizens desire positive labeling, respecting their autonomy thus supports a positive labeling schema. With respect to the GE labeling debate, numerous surveys have revealed that the majority of Americans want genfoods to be labeled. For instance, in 2004 the Pew Initiative on Food and Biotechnology found that 92% of those polled favor the labeling of foods that are genetically modified (Pew Initiative 2004). Similarly, in October 2003 the Food Policy Institute at Rutgers University released a poll showing that the vast majority of respondents (94%) agreed that food with GE ingredients should be labeled as such (Hallman et al. 2003). Moreover, a 2001 USA Today poll released its finding that 79% of Americans surveyed believe it should not be legal to sell genetically engineered fruits and vegetables without special labels (True Food Network). However, despite popular opinion, the FDA continues to allow food producers and distributors to market transgenic crops without labels.

In other Miami Group countries where public opinion surveys have been taken, most people also prefer labeling. According to Naomi Klein (2001), a noted Canadian journalist and activist, "…more than 90% of Canadians tell pollsters that they want labels… that tell them if their food's genetic makeup has been tampered with". Similar consumer reactions were also reported in a study conducted by Andrea Mucci and Guillermo Hough (2004) from the *Instituto Superior Experimental de Tecnologia Alimentari* in Argentina. Therefore, by adopting a non-GE labeling policy, the Miami Group countries have ignored the policy preferences of their citizens, and in doing so, have dismissed their political autonomy.

The Great Question: To label or not to label

Negative vs. Positive Labeling

Proponents of genetic engineering such as Kirsten Hansen have often challenged this labeling argument by reasoning that the currently employed voluntary negative labeling of traditional foods helps consumers make informed choices inasmuch as the hypothetical, positive labeling of GE foods.[10] Consequently, from Hansen's point of view, the current policy is ethical and should be continued well into the future. However, it is argued here that Hansen's argument is mistaken.

Firstly, Hansen points out that the negative labeling of traditional foods provides consumers with all the information they need to know about genfoods. To a certain extent, this holds true "insofar as consumers…assume that every product not specifically labeled 'GE free' or 'organic' may be genetically engineered or may contain GE ingredients" (Rubel and Streiffer 2005, p.77). If consumers assume that all foods without a 'GE free' or 'organic' label are genetically engineered or contain genetically engineered ingredients, then they have all the information they need to know. However, as Rubel and Streiffer (2005) correctly concluded, consumers simply do not assume that all foods without the negative labels might be genetically engineered. This was indicated in a 2003 survey (conducted by the Pew Initiative on Food and Biotechnology) where "sixty percent of American consumers believed that they had never eaten genetically engineered foods, even though seventy percent of foods on grocery store shelves contain genetically engineered ingredients" (Rubel and Streiffer 2005,

[10] Negative labeling is the labeling of foods as "organic," "GE-free," or "non-genetically engineered" whereas positive labeling involves labeling foods as "genetically engineered"

p. 77; Pew Initiative 2003a). Thus, Hansen's argument is most unpersuasive because there is considerable reason to think that consumers would not simply assume unlabeled foods might be genetically engineered.

Secondly, Hansen confidently assumes that all negatively labeled foods are not genetically engineered. While this may generally be true, the agricultural output of organic farmers is occasionally contaminated by wind-borne pollen from neighboring GE farms. For instance, shortly after a farmer planted a genetically engineered corn seed in Capulalpan, Mexico, the entire farming community began noticing slight changes in their corn supply, even though they never planted these corn seeds. Illustrating the rapidity of crop contamination, corn farmers in the United States filed a class action lawsuit against Aventis for the contamination of their fields with Starlink (Pringle 2003). In their lawsuit, the plaintiffs claimed that Aventis failed to take appropriate measures to prevent Starlink from contaminating their fields, and that, as a result, the plaintiffs lost significant domestic and foreign markets since Starlink was found to trigger dangerous allergies.[11] In another case, after Percy Schmeiser, a local Saskatchewan farmer, found himself accused by Monsanto for illegally planting the company's genetically modified, patented canola, he countersued and filed a $4.2 million dollar lawsuit claiming that Monsanto's Roundup Ready canola plants trespassed and contaminated his fields. Far from a thief, Schmeiser maintained he had never planted the Roundup seeds and that he was a victim of a new technology invading his farm. Although the court ultimately ruled against Percy Schmeiser, this case once again illustrates the real possibility of crop contamination.[12]

The contamination of organic farms allows transgenic crops to accidently slip on supermarket shelves as organic or GE free food. The fact that organic labels are awarded on the basis of production methods, not evaluation on the final end-product, increases the likelihood that organic foods may be labeled incorrectly. And so, the accuracy of organic or GE free labels is very much questionable since products labeled as organic may actually be genetically engineered. This raises some concern because as farmers sow more and more genetically engineered seeds, it seems as if the rate of contamination will also increase. Given the inevitable spread of crop contamination, consumers would be better informed if GE foods were positively labeled.

Positive Labeling is in Everyone's Interest (Including the Biotech Industry and Government)

In addition to Hansen, many other proponents of genetic engineering such as Gregory Conko, director of food safety policy at the Competitive Enterprise Institute, have argued in favor of negative labeling. Conko supports the negative labeling of traditional foods because he believes the positive labeling of GE foods would unnecessarily stigmatize products of agricultural biotechnology. This seems entirely possible given the politically charged atmosphere surrounding genetically modified foods. According to Conko (2002), "the mere requirement of a label could be misconstrued by some consumers to suggest that biotech-derived foods differ in an important way (such as safety or nutrition) when they do not."

Contrary to Conko's belief, negative labeling may actually heighten the public's fears over GE foods. By withholding information and institutionalizing a certain amount of consumer ignorance, negative labeling would perpetuate what Leiss and Powell (2004) call "the risk

[11] StarLink Corn Products Liability Litigation 212 F. Supp. 2d 828 (N.D. Ill. 2002).
[12] Monsanto Canada Inc. v. Schmeiser, 3 F.C. 35 (2001).

information vacuum". This phenomenon arises where, over a long period of time, those who are conducting the research and safety assessments make little or no effort to communicate their results to the public. As a consequence of this communication failure, the "experts" and the "public" develop a different understanding and perception of the same risks. The example of GE foods offers an excellent illustration of this phenomenon. The decision of biotech corporations and food producers to market GE foods without educating the public about their potential risks and benefits has created a risk information vacuum. This vacuum has been filled over the years by conflicting sources of information (i.e. dribbles of scientific information, media coverage, reports from NGOS and interest groups) and worrisome, high-profile events such as the L-trytophan scare, the rBGH study, the Starlink outbreak, and cases of crop contamination. As consumers learned more about biotechnology, the aforementioned events raised the public's apprehensions that there may be unintended, harmful consequences of consuming transgenic crops. In a risk information vacuum, the public's apprehensiveness may continuously "feed upon itself, and in the absence of the dampening effect that good risk communication might supply, may be amplified to the point where credible and pertinent information makes no difference in the formation of popular opinion" (Leiss and Powell 2004, p. 214). The silence of governmental agencies such as the FDA and Health Canada to engage in a dialogue with the public and address the ethical, safety, and environmental issues of GE foods only amplified social perceptions of risk.

The failure of both the biotech industry and the government to openly communicate with society has reinforced the public's suspicion and distrust of the former and latter. This has damaged the reputation and business of the biotech corporations as shown by recent surveys in North America and the United Kingdom that found that perceptions of trust in government and agribusiness regulation, regarding either pesticides or the products of agricultural biotechnology, are the strongest predictors of consumer support (Dittus and Hillers 1993; Leiss and Powell 2004). And so, people who think pesticides and agricultural biotech products have not been adequately regulated have the greatest concerns about risks. Lending support to this hypothesis that trust influences risk perception, Van Ravensway (1996) concluded in his article that trust in government and industry may have more of an effect on risk perception than the actual safety or danger of a product.

Moreover, in a recent study conducted by Zepeda et al. (2003), it was found that consumers who felt they were involuntarily subjected to milk from rBGH-treated cows had increased risk perceptions. The implication from Zepeda's study is that consumers will perceive products of biotechnology as risky or inherently dangerous as long as they have no choice regarding exposure to them. Although it was determined that negative labeling helped reduce anxiety towards rBGH milk, it is possible that the positive labeling of rBGH milk could have more of an effect on consumers. Not only could positive labels mitigate the involuntary "outrage factor," but they could also help the government and biotech industry regain the trust of consumers, which is desperately needed if biotechnology is to be accepted (Sandman 1989).

Therefore, learning from the aforementioned studies, one possible way to reduce the public's current fears over transgenic crops is for the government to exercise its authority and mandate the labeling of GE foods. Biotech corporations should comply with such a requirement since it may indicate genuine respect and concern for consumer welfare and consumer autonomy. According to experiments by Frewer et al. (1996), trust appears to be integrally linked with perceptions of accuracy, knowledge, and concern with public welfare. Hence, positive labeling may help biotech corporations regain the public's trust by demonstrating that the biotech industry is responding to societal demands. Meanwhile, for

consumers, positive labeling would protect their autonomy and ensure they can differentiate GE from non-GE foods, thereby enabling them to make decisions in accordance with their concerns, whatever they may be.

However, labeling cannot solve the problem if it is not preceded by a substantial education project. Such a project would help the public better understand the risks and benefits posed by GE foods, and in the process would ensure that consumers make an informed, unbiased choice between GE and non-GE foods. In addition, this would help counter the fears of both the biotech industry and the government that either misinformed or ill-informed consumers were influencing public policy decisions (Jackson 2000). Therefore, contrary to the beliefs of Conko and the many other proponents of biotechnology, the fears of all parties – consumers, the biotech corporations, and the government – may be effectively reduced by positive labeling.

Conclusion: The Future of Biotechnology

While genetic engineering has been used to modify plants, this technology is currently being applied to animals as well. Already, some researchers have implanted spinach genes into pigs in order create animals that are healthier to eat (MacLaughlin 2003; Young 2002). In addition, a 2001 FAO report described attempts to engineer bigger salmon and Tilapia (another kind of fish) by inserting Arctic flounder genes into their DNA (Diouf 2001). Flash forward to the present, now over thirty-five species of transgenic fish have been developed by such biotechnology companies as Aqua Bounty Technologies Inc. and A/F Protein (Center for Food Safety 2006b; Eenennaam 2005; Pew Initiative 2003b). Although they have not yet been commercialized, transgenic fish as well as other genetically engineered animals seem to be heading in this general direction. With the expansion of modern biotechnology into more and more foods, including meat, one cannot help but think that this is not “the end, nor the beginning, but the end of the beginning” (Winston Churchill).

Therefore, the future of genfood regulation will concern not only transgenic crops but also transgenic animals. The introduction of genetically altered meat presents many problems since it will indubitably exacerbate the ongoing ethical dilemmas in the Miami Group countries, especially those pertaining to consumer safety, consumer sovereignty, and citizen autonomy. Anticipating these events, it is imperative for Argentina, Canada, and the United States to react prior to the second phase of genetic engineering and to do so by positively labeling products of agricultural biotechnology.

References

Akech, J. M. M. (2006), “Developing Countries at Crossroads: Aid, Public Participation, and the Regulation of Trade in Genetically Modified Foods,” *Fordham International Law Journal*, 29, 265-98.

Bailey, Ronald (2000), “Billions Served: Norman Borlaug Interviewed by Ronald Bailey,” *Reason Magazine*, available http://www.reason.com/news/show/27665.html.

Beardsworth, Alan and Teresa Keil (1997), *Sociology on the Menu: An Invitation to the Study of Food and Society*, New York: Routledge.

Beck, Ulrich (1992), *Risk Society: Towards a New Modernity*, London: Sage.

Beck, Ulrich (1994), "The Reinvention of Politics: Towards a Theory of Reflexive Modernization," in Ulrich Beck, Anthony Giddens, and Scott Lash, eds. *Reflexive Modernization: Politics, Tradition, and Aesthetics in the Modern Social Order*, Cambridge: Polity Press, pp. 1-55.

Beck, Ulrich (1995), *Ecological Politics in the Age of Risk*, Cambridge: Polity Press.

Benbrook, Charles M. (2004), "Genetically Engineered Crops and Pesticide Use in the United States: The First Nine Years," available www.ucsusa.org/assets/documents/food_and_environment/Benbrook.pdf.

Burgess, J. A. and A. J. Walsh (1999), "Consumer Sovereignty, Rationality, and the Mandatory Labeling of Genetically Modified Food," *Business and Professional Ethics*, 18 (3 & 4), 7-26.

Center for Food Safety (2006a), "Worldwide Regulation, Prohibition, and Production," available www.centerforfoodsafety.org/geneticall5.cfm.

Center for Food Safety (2006b), "Genetically Engineered Fish: Campaign Overview," available www.centerforfoodsafety.org/campaign_o.cfm.

Clark, E. A. and Hugh Lehman (2001), "Assessment of GM Crops in Commercial Agriculture," *Journal of. Agricultural & Environmental Ethics*, 14, 3-5.

Clapp, Jennifer (2005), "The Political Economy of Food Aid in an era of agricultural biotechnology," *Global Governance*, 11, 467-485.

Comstock, Gary (2000), *Vexing Nature? On the Ethical Case Against Agricultural Biotechnology,* Boston: Kluwer Academic Publishers.

Conko, Gregory (2002), "Eat, Drink, and Be Merry: Why Mandatory Biotech Food Labeling is Unnecessary," available www.cei.org/pdf/3250.pdf.

Conko, Gregory (2003), "The Labeling of Genetically Engineered Food Should Not Be Mandatory," in Louise I. Gerdes, ed. *Genetic Engineering: Opposing Viewpoints,* San Diego: Greenhaven Press, 180-184.

Council for Biotechnology Information (2001), "Substantial Equivalence in Food Safety Assessment," available www.whybiotech.com/html/pdf/Substantial_Equivalence.pdf.

Cummins, Ronnie and Ben Lilliston (2000), *Genetically Engineered Food: A Self-Defense Guide for Consumers*, New York: Marlowe and Company.

Cummins, Ronnie (2004), "Genetic Engineering Threatens Society," in Louise I. Gerdes, ed. *Genetic Engineering: Opposing Viewpoints*, San Diego: Greenhaven Press, 32-38.

Devonchik, Jeffrey (2000), "Selected Essay: Contemporary International Law Issues: Genetically Modified Organisms," *Florida Coastal Law Journal*, 2, 163-164.

Diouf, Jacques (2001), “Genetically Modified Organisms, Consumers, Food Safety, and the Environment,” *Food and Agriculture Organization*, available ftp://ftp.fao.org/docrep/fao/003/X9602e/X9602e00.pdf.

Dittus, K. L. and V. N. Hillers (1993), “Consumer Trust and Behavior Related to Pesticides,” *Food Technology*, 47 (7), 87-89.

Duall, Elizabeth (2004), “A Liability and Redress Regime For Genetically Modified Organisms Under the Cartagena Protocol,” *The George Washington International Law Review*, 36(1), 173-202.

Eenennaam, Alison L. Van (2005), “Genetic Engineering and Fish,” University of California, Division of Agriculture and Natural Resources, available http://anrcatalog.ucdavis.edu/pdf/8185.pdf.

Food and Drug Administration (1992), “Statement of Policy: Foods Derived from New Plant Varieties,” *Federal Register*, 57 (104), 22983-23000.

Friedland, Michelle T. (2005), “You call that Organic?- The USDA’s Misleading Food Regulations,” *NYU Environmental Law Journal*, 13, 379-438.

Frewer, L. J. et al. (1996), “What Determines Trust in Information about Food-Related Risks? Underlying Psychological Constructs,” *Risk Analysis*, 16, 473-86.

Grogan, John and Cheryl Long (2000), “The Problem with Genetic Engineering,” *Organic Gardening*, 47, 42-47.

Gruere, Guillaume (2007), “International Trade-Related Regulations of GM Food,” available www.ifpri.org/pbs/pdf/pbsbriefgruere.pdf.

Hallman et al. (2003), “Public Perceptions of Genetically Modified Foods: A National Study of American Knowledge and Opinion,” available www.foodpolicyinstitute.org/docs/reports/NationalStudy2003.pdf.

Hansen, Kirsten (2004), “Does Autonomy Count in Favor of Labeling Genetically Modified Food,” *Journal of Agricultural and Environmental Ethics*, 17(1), 67-76.

Henkel, John (1998), “Genetic Engineering Fast Forwarding to the Future,” *FDA Consumer Magazine*, available www.fda.gov/bbs/topics/CONSUMER/geneng.html .

Hutt, William H. (1936), *Economists and the Public; a Study of Competition and Opinion*, London: J. Cape.

Jackson, Debra (2000), “Labeling Products of Biotechnology: Towards Communication and Consent,” *Journal of Agricultural and Environmental Ethics*, 12, 319-330.

Klein, Naomi (2001), “Soon all our Foods will be Polluted by Genetic Modification,” *The Guardian*, available www.guardian.co.uk/environment/2001/jun/21/food.gm.

Krimsky, Sheldon, and Nora Murphy (2001), *Science-Based Policy in the Controversy over Genetically Modified Foods,* Cambridge: Council for Responsible Genetics.

Kysar, Douglas A. (2004), “Preferences for Processes: The Process/Product Distinction and the Regulation of Consumer Choice,” *The Harvard Law Review*, 118 (2), 525-624.

Leiss, William and Douglas Powell (2004), *Mad Cows and Mother’s Milk: The Perils of Poor Risk Communication*, 2nd edition, Montreal: McGill-Queen’s University Press.

Lupton, Deborah (1999), *Risk*, New York: Routledge.

MacLaughlin, Sara J. (2003), “Food for the Twenty-First Century: An Analysis of Regulations for Genetically Engineered food in the United States, Canada, and the European Union,” *Indiana International and Comparative Law Review*, 14, 375-407.

McHugen, Alan (2000), *Pandora’s Picnic Basket: The Potential and Hazards of Genetically Modified Foods*, New York: Oxford University Press.

Mennell, Stephen and Anne Murcott (1992), *The Sociology of Food: Eating, Dieting, and Culture*, London: Sage.

Mucci, Andrea and Guillermo Hough (2004), “Perceptions of Genetically Modified Foods by Consumers in Argentina,” *Food Quality and Preference*, 43, 44-51.

National Institute of Agrobiological Sciences, Japan (July 2002), “Cytochrome P450 Gene of Transgenic Rice Plant Shows Herbicide Resistance,” available www.agnet.org/library/rh/2002009b.

Newell, Peter (2006), “Corporate Power and ‘Bounded Autonomy’ in the Global Politics of Biotechnology,” in Robert Falkner, ed. *The International Politics of Genetically Modified Food: Diplomacy, Trade, and Law,* New York: Palgrave.

The Nuffield Council on Bioethics (2003), “The Use of Genetically Modified Crops in Developing Countries,” available www.nuffieldbioethics.org/fileLibrary/pdf/GM_Crops_Discussion_Paper_2004.pdf

Nuffield Council on Bioethics (1999), “Genetically Modified Crops: The Ethical and Social Issues,” available www.nuffieldbioethics.org.

Oriola, Taiwo A. (2002), “Consumer Dilemmas: The Right to Know, Safety, Ethics, and Policy of Genetically Modified Food,” *Singapore Journal of Legal Studies*, 2, 514-573.

Pascalev, Assya (2003), “You Are What You Eat: Genetically Modified Foods, Integrity, and Society,” *Journal of Agricultural and Environmental Ethics*, 16, 583-594.

Pence, Gregory (2002), *Designer Food: Mutant Harvest or Breadbasket of the World?*, Lanham, Maryland: Rowman and Littlefield Publishers Inc.

Pew Initiative on Food & Biotechnology (2001), “Guide to U.S. Regulation of Genetically Modified Food and Agricultural Biotechnology Products,” available http://pewagbiotech.org/resources/issuebriefs/1-regguide.pdf.

Pew Initiative on Food & Biotechnology (2003a), “GM Food Safety: Are Government Regulations Adequate?,” available www.pewagbiotech.org/buzz/display.php3?StoryID=42.

Pew Initiative on Food & Biotechnology (2003b), “Future Fish: Issues in Science and Regulation of Transgenic Fish,” available http://pewagbiotech.org/research/fish/.

Pew Initiative on Food & Biotechnology (2004), “Overview of 2004 Findings Focus Groups & Poll,” available http://pewagbiotech.org/research/2004update/toplines.pdf.

Pouteau, Sylvia (2002), “The Food Debate: Ethical Versus Substantial Equivalence,” *Journal of Agricultural and Environmental Ethics*, 15, 289-303.

Pringle, Peter (2003), *Food Inc. Mendel to Monsanto - the Promises and Perils of the Biotech Harvest*, New York: Simon & Schuster.

Rich, Matthew (2004), “The Debate Over Genetically Modified Crops in the United States: Reassessment of Notions of Harm, Difference, and Choice,” *Case Western Reserve Law Review*, 54, 889-907.

Rubel, Alan and Robert Streiffer (2005), “Respecting the Autonomy of European and American Consumers: Defending Positive Labels on GM Foods,” *Journal of Agricultural and Environmental Ethics*, 18, 75-84.

Sandman, P .M. (1989), “Hazards vs. Outrage in the Public Perception of Risk,” in V.T. Covello, D.B. McCallum, M.T. Pavlova, eds. *Effective Risk Communication: The Role and Responsibility of Government and Nongovernmental Organizations*, New York: Plenum Press.

Sheldon, Ian M. (2002), “Regulation of biotechnology: will we ever ‘freely trade,’” *European Review of Agricultural Economics*, 29 (1), 155-176.

Strauss, Debra M. (2006a), “The International Regulation of Genetically Modified Organisms: Importing Caution Into the U.S. Food Supply,” *The Food and Drug Law Journal*, 61, 167-178.

Strauss, Debra M. (2006b), “Genetically Modified Organisms in Food: a Model of Labeling and Monitoring with Positive Implications for International Trade,” *The International Lawyer*, 40, 95-128.

Steinbrecher, Ricarda (May/June 1998), “What is Wrong with Nature,” *Resurgence Magazine*, 16-19.

Teitel, Martin and Kimberly Wilson (1999), *Genetically Engineered Food: Changing the Nature of Nature*, 2nd edition, Rochester, VT: Park Street Press.

Thompson, Paul B. (2000), “Agricultural Biotechnology, Ethics, Food Safety, Risk, and Consent,” in Thomas Murray and Maxwell Mehlman, eds. *Encyclopedia of Ethical, Legal, and Policy Issues in Biotechnology,* New York: John Wiley & Sons, Inc.

Thompson, Paul B. (1997), “Food Biotechnology’s Challenge to Cultural Integrity and Individual Consent,” *The Hastings Center Report*, 27 (4), 34-40.

The True Food Network. “US Opinion Polls on Genetically Engineered Food,” available www.truefoodnow.org/home_polls.html.

Van Ravensway, E.O. (1995), *Public Perceptions of Agrichemicals*, Ames, IA: Council for Agricultural Science and Technology.

Weiss, Rick (2007), “USDA Backs Production of Rice with Human Genes,” *The Washington Post*, 2 March, A02.

Young, Emma (2002), “GM Pigs are Both Meat and Veg.,” *New Scientist*, January, available www.newscientist.com/hottopics/gm.

Zarrilli, Simonetta (2005), “International Trade in GMOs and GM Products: National and Multilateral Legal Frameworks,” *United Nations Policy Issues in International Trade and Commodities*, available www.thecampaign.org/UNCTAD.pdf.

Zepeda, Lydia et al. (2003), “Consumer Risk Perceptions Towards Agricultural Biotechnology, Self-Protection, and Food Demand: The Case of Milk in the United States,” *Risk Analysis*, 23(5), 973-984.

Zepeda, Lydia (2001), “Don’t Ask, Don’t Tell: US Policy on Labeling Genetically Engineered Foods,” *Transactions*, 89, 121-29.