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A New Age of Evolution: Protecting the Consumer's Moral and Legal Right to Know through the Clear and Transparent Labeling of All Genetically Modified Foods

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A NEW AGE OF EVOLUTION: PROTECTING THE CONSUMER'S MORAL AND LEGAL RIGHT TO KNOW THROUGH THE CLEAR AND TRANSPARENT LABELING OF ALL GENETICALLY MODIFIED FOODS

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I. INTRODUCTION

When you have a chance, randomly choose a few items out of your pantry or fridge that contain labels with ingredient sections. Take a brief moment to look over the ingredients to see how many contain one or more of the following: sugar, soy,[1] vegetable oil, canola, or corn.[2] Did you find at least one of those ingredients in each of your labels? More than likely your answer is 'yes.' This is because these items make up the building blocks of the processed food products many of us enjoy today.[3] While this list does not encompass all of the ingredients that contain genetically modified (GM) organisms it does contain the most prevalent genetically modified crops.[4] Genetic engineering is a molecular biology process that manipulates an organism's genes by introducing, eliminating, or rearranging specific genes within an organism.[5] By tweaking the DNA of an organism, genetic engineering changes the type or amount of proteins an organism is capable of producing, which enables the organism to create new substances or perform new functions.[6]

Now, going back to your randomly selected food products, look to see if anywhere on that same label there is a disclaimer stating that these specific ingredients contain genetically modified organisms (GMOs). Do you see one? Probably not. This does not mean, however, that genetically modified organisms are not in your food. Actually, they are in every one of the items listed above. The United States government, until recently, did not require the labeling of genetically modified organisms.[7] On July 29, 2016 President Barack Obama signed into law the National Bioengineered Food Disclosure Standard (NBFDS)[8]. This law directs the USDA to create regulations that require manufacturers to disclose certain bioengineered products on food labels.[9] On

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[1]Dr. Mercola, *Soybean Oil: One of the Most Harmful Ingredients in Processed Foods*, MERCOLA (Jan. 27, 2013), https://articles.mercola.com/sites/articles/archive/2013/01/27/soybean-oil.aspx.

[2] Margie Kelly, *Top 7 Genetically Modified Crops*, HUFFINGTON POST (Oct. 30, 2012, 05:05 PM), https://www.huffingtonpost.com/margie-kelly/genetically-modified-food_b_2039455.html.

[3] Margaret McLean, *An Introduction to the Ethical Issues in Genetically Modified Foods*, MARKKULA CENTER (Apr. 15, 2005), https://www.scu.edu/ethics/focus-areas/bioethics/resources/genetically-modified-food/.

[4] Dr. Edward, *The Top 20 GMO Foods and Ingredients to Avoid*, GLOBAL HEALING CENTER (July 24, 2013), https://www.globalhealingcenter.com/natural-health/top-20-gmo-foods-and-ingredients-to-avoid/.

[5] USDA, *Agricultural Biotechnology Glossary* (Last Visited May 10, 2019), https://www.usda.gov/topics/biotechnology/biotechnology-glossary.

[6] Kevin Keener, et al., *Biotechnology and its Applications*, NORTH CAROLINA STATE UNIVERSITY: COLLEGE OF AGRICULTURE AND LIFE SCIENCES (Last Visited May 10, 2019), https://fbns.ncsu.edu/extension_program/documents/biotech_applications.pdf.

[7] Luis Acosta, *Restrictions on Genetically Modified Organisms: United States*, LIBRARY OF CONGRESS (March 2014), https://www.loc.gov/law/help/restrictions-on-gmos/usa.php#_ftn11.

[8] Pub. L. No. 114-216, 130 Stat. 834

[9] National Bioengineered Food Disclosure Standard, 7 U.S.C. §1639b (2016).

December 20, 2018 the USDA released the final regulations for the NBFDS, which requires food manufactures, importers, and certain retailers to ensure bioengineered foods are appropriately disclosed.[10] The final regulations include provisions which will leave the majority of GMO derived foods unlabeled.[11] The final regulations also restrict approximately 100 million Americans from accessing GMO information by allowing QR codes to replace clear and transparent labeling, an issue that will be discussed in further detail later in this Note.[12] This Note explores why you, as a consumer may want to know whether your food contains GM products, and furthermore, why you as a consumer have a moral[13], and legal right to know[14].

In 1972, Herbert Boyer and Stanley Cohen ushered in a new age of biotechnology when they developed a technique that allowed them to splice and attach DNA molecules from one species to another. Throughout the 1970s and 1980s, genetic engineering grew within the international community, with scientists genetically engineering plants (e.g., tobacco), medicine (e.g., insulin[15]), and animals (e.g., mice). In 1990, the Food and Drug Administration approved the first genetically modified food, an enzyme used in cheese production.[16] This approval by the FDA was the first time that the federal government approved the use of a genetically modified organism within the consumer market.[17] A study by Rutgers University in 2003 determined that

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[10] Bioengineered Disclosure, UDSA (Last Visited May 10, 2019), https://www.ams.usda.gov/rules-regulations/be.

[11] Andrew Kimbrell, et al., *Long-Awaited Final Regulations for GMO Food Labeling Leave Millions of Americans in the Dark*, THE CENTER FOR FOOD SAFETY (Dec 20, 2018), https://www.commondreams.org/newswire/2018/12/20/long-awaited-final-regulations-gmo-food-labeling-leave-millions-americans-dark.

[12] Lauren Bradford, *To Scan or Note to Scan*, U. OF DEL. (June 3, 2019), https://www.udel.edu/udaily/2019/june/kent-messer-qr-code-oysters-consumer-habits/.

[13] In the legal realm, the term "moral right" can refer to the rights of creators of intellectual property. In this Note, the term "moral right" is meant to signify a right that is established through mutual respect among citizens, regardless of the law.

[14] Legal rights are rights that are established through the law. GMO labeling is also considered a legal right because of the National Bioengineered Food Disclosure Standard.

[15] In 1982, the FDA approved the first genetically modified product, Humulin, a form of insulin.

[16] *FDA Approves 1st Genetically Engineered Product for Food*, THE WASH. POST (March 24, 1990), https://www.latimes.com/archives/la-xpm-1990-03-24-mn-681-story.html.

[17] *Id*.

between 60% and 70% of processed food on American shelves include GM crops.[18] This number continues to rise as more GM crops are planted in the U.S.[19]

From the onset, food producers' primary purpose for genetically engineering crops was to increase crop yield by increasing resistance to pesticides, in particular, glyphosate.[20] Glyphosate is a non-selective herbicide, which means that it will kill most plants it comes into contact with.[21] Monsanto in particular, hired chemists in the 1970s to insert spliced genetic material from the glyphosate molecule into various plants, including soybeans, canola, cotton, corn, sugar beets, and alfalfa.[22] These glyphosate tolerant crops have come to be known as "Roundup Ready" crops because of their tolerance to Monsanto's herbicide by the same name (Roundup Ready).[23] Early supporters of GM crops promoted genetic engineering on the premise that crops derived from genetically modified organisms would require much less pesticide use.[24] Although a decrease in pesticide use accompanied the early years of genetically modified crops, this pattern quickly changed.[25] Insects and unwanted vegetation began to adapt to the heavy herbicide and pesticide use, creating a new species of "super-bugs" and "super-weeds" that required much more herbicide and pesticide use to ward off.[26] Instead of lowering pesticide use, genetically modified organisms have

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[18] William Hallman, PhD, et al., *Public Perceptions of Genetically Modified Foods: A National Study of American Knowledge and Opinion*, FOOD POLICY INSTITUTE (Oct 2003), https://foodpolicy.rutgers.edu/docs/pubs/2003_Public_Perceptions_of_Genetically_Modified_Foods.pdf.

[19] Seth Wechsler, *Recent Trends in GE Adoption*, USDA (July 16, 2018), https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us/recent-trends-in-ge-adoption.aspx.

[20] Stephen Duke & Stephen Powles, *Glyphosate-Resistant Crops and Weeds: Now and in the Future*, AG BIO FORUM (2009), http://agbioforum.org/v12n34/v12n34a10-duke.htm.; *see* Jennifer Hsaio, *GMOs and Pesticides: Helpful or Harmful*, SITN HARVARD (Aug. 10, 2015), http://sitn.hms.harvard.edu/flash/2015/gmos-and-pesticides/.

[21] Oregon State University, *Distinguishing Between Selective and Nonselective Herbicides*, FORAGE INFORMATION SYSTEM (Last Visited May 10, 2019), https://forages.oregonstate.edu/nfgc/eo/onlineforagecurriculum/instructormaterials/availabletopics/weeds/herbicides.

[22] Tracy Frisch, *Monsanto's Toxic Legacy: An Investigative Reporter Talks Glyphosate*, IN THESE TIMES (Mar 9, 2018), http://inthesetimes.com/rural-america/entry/20981/carey-gillam-monsanto-glyphosate-roundup-cancer-whitewash-pesticides*; see also Glyphosate*, ANRESCO LABORATORIES (Last Visited May 10, 2019), https://food.anresco.com/services/glyphosate/.

[23] Duke, *supra* note 20.

[24] Dan Charles, *How GMOs Cut the Use of Pesticides – And Perhaps Boosted It Again*, NPR FOOD FOR THOUGHT (Sep 1, 2016), https://www.npr.org/sections/thesalt/2016/09/01/492091546/how-gmos-cut-the-use-of-pesticides-and-perhaps-boosted-them-again.

[25] Charles Benbrook, *Impacts of Genetically Modified Crops on Pesticide Use in the U.S.- the First Sixteen Years*, ENVTL. SCI. EUROPE (Sept. 28, 2012), https://enveurope.springeropen.com/articles/10.1186/2190-4715-24-24/.

[26] *Id.*

encouraged a steady increase in pesticide and herbicide use.[27] Studies that trace unnatural toxicity levels in humans back to genetically modified organisms are also on the rise across the globe.[28] The close relationship between genetically modified crops, high toxicity levels, and human and environmental health may be one reason why many citizens favor the labeling of GMOs.[29]

Labeling food products that contain genetically modified organisms has been a highly contested issue in the United States and abroad, with 65 countries currently requiring the labeling of genetically modified ingredients.[30] Currently in the United States, the labeling of genetically modified ingredients is only required for a limited amount of GM products, through the use of a QR Code.[31] Most scientists in the United States believe that GM products are no different than their conventional counterparts, which is why there are multiple exemptions in the current GM labeling regulations.[32] In a field where no credible, independent long-term studies exist, many opponents of GM crops argue that more objective, standardized testing needs to be carried out before this assumption can be made.[33] Proponents of labeling often wonder, if these products are safe, why is there such an opposition to labeling them?

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[27] Ramon Seidler, Ph.D., *Pesticide Use on Genetically Engineered Crops*, ENVTL. WORKING GROUP (September 2014), http://static.ewg.org/agmag/pdfs/pesticide_use_on_genetically_engineered_crops.pdf; *see* Benbrrok, *supra* note 25.

[28] Aziz Aris & Samuel Leblanc, *Maternal and Fetal Exposure to Pesticides Associated to Genetically Modified Foods*, REPROD TOXICOL (Feb. 13, 2011), https://www.ncbi.nlm.nih.gov/pubmed/21338670 (Maternal and fetal exposure to pesticides associated to genetically modified foods in Eastern Townships of Quebec, Canada); *see* Sándor Spisák et al., *Complete Genes May Pass from Food to Human Blood*, PLOS CORP. (July 30, 2013), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0069805 (Complete Genes May Pass from Food to Human Blood); *see* S. Thongprakaisang, et al., *Glyphosate Induces Human Breast Cancer Cells Growth Via Estrogen Receptors*, U.S. LIBRARY OF MEDICINE (Oct. 10, 2016), https://www.ncbi.nlm.nih.gov/pubmed/23756170 (Glyphosate induces human breast cancer cells growth via estrogen receptors); *see Glyphosate Found in Urine of 93 Percent of Americans Tested*, ECO WATCH (May 29, 2016), https://www.ecowatch.com/glyphosate-found-in-urine-of-93-percent-of-americans-tested-1891146755.html (93% of Americans tested had glyphosate in their urine).

[29] *GMOs*, USRTK, https://usrtk.org/gmos/.

[30] Christina Sarich, *The 64 Countries that Require GMO Labeling*, NAT. SOC'Y (Oct. 13, 2014), http://naturalsociety.com/64-countries-require-gmo-labeling-not-united-states/ (Although the link states 64 Countries, the United States recently became the 65th Country).
[31] National Bioengineered Food Disclosure Standard, 7 U.S.C. §1639b (2016).

[32] The National Academics of Sciences, Engineering, and Medicine, *Genetically Engineered Crops: Experiences and Prospects*, BOARD ON AGRIC. AND NAT. RESOURCES (May 2016), https://www.scribd.com/document/312840975/Genetically-Engineered-Crops-Experiences-and-Prospects-Report-in-Brief.

[33] Bruce Chassey, *GMO Answers: Q&A on Genetic Engineering*, GMO ANSWERS (Oct. 24, 2013, 6:15 PM), https://gmoanswers.com/ask/are-there-any-long-term-30-years-studies-done-full-spectrum-ecological-impact-transgenic-gmo.

In this Note, the consumer's "right to know" is addressed as a moral and legal right. Moral rights are rights that have been agreed upon by a society and often stem from cultural norms that have been instilled over time.[34] They are often grounded in humanity because they are rights that all people deserve simply for being human.[35] An example of a moral right (also known as an ethics based right) would be the right to life, liberty and the pursuit of happiness. In connection, many legal rights that we have in the United States flow from this right, such as the right to earn a living and enjoy the fruits of one's labor. Moral rights are directly connected to GM products because of environmental and ethical issues individuals have with genetic engineering. Issues such as soil depletion and potential bearings on biodiversity may impact the food choices of a faithful environmentalist.[36] The notion by some that the splicing of genes from one organism to another is "unnatural" may go against an individual's religious (or other ethical) principles.[37] The push from many consumers in the United States to label GM foods spans from an array of concerns and all support the moral right to know.

On the other hand, legal rights are rights that people have under a legal system, granted by an authorized legal authority or government. For example, consumers have a legal right to know the basic ingredients and nutritional profile of packaged foods. Law and ethics are different because the law determines what a person must do, while ethics determines what a person should do. The former is collectively accepted while the latter is seen as ideal human conduct, agreed upon by most of the people. However, law and ethics are also intimately related to each other. Laws are generally based on the moral principles of society and both regulate the conduct of the individual in society. This Note proposes that clear and transparent labeling of food that contains GM products is a moral and legal right of consumers in the United States.

Three U.S. Regulatory Agencies are responsible for the regulation of genetically engineered plants: The USDA's Animal and Plant Health Inspection Service (USDA-APHIS)[38], the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). The Federal Food, Drug, and Cosmetic Act as well as the Fair Packaging and Labeling Act, are the Federal laws governing food products that fall under FDA regulation.[39] This Note concludes that the FDA, rather than the USDA

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[34] Manuel Velasquesz et. al., *Rights*, MARKKULA CTR. FOR APPLIED ETHICS (Aug. 8, 2014), https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/rights/.

[35] *Id.*

[36] Mercola, *supra* note 1.

[37] Brittany Shoot, *GMO or No: Problematic Intersections of Religion, Biotechnology, and Foo*d, RELIGION DISPATCHES (Dec. 2, 2009), http://religiondispatches.org/gmo-or-no-problematic-intersections-of-religion-biotechnology-and-food/.

[38] The USDA-APHIS is responsible for protecting agriculture from pests and diseases. Under the Plant Protection Act, the agency was delegated the responsibility of regulatory oversight over products of modern biotechnology that could pose a plant-pest risk. Because our system to regulate and test GM products is already set up in a tri-agency framework, this Note proposes to continue this framework by allowing the USDA-APHIS to regulate plant-pest risks, the EPA to deal with residue levels, and the FDA to deal with the labeling of GM products.

[39] 15 U.S.C. §1453 (1992).

should be delegated the responsibility to promulgate a new GM labeling law that requires clear, transparent labeling for all products containing GMOs in order to support the consumer's moral and legal right to know.

Section II of this Note contains five subsections that address the background of the Food and Drug Administration, as well as the history of labeling food in America. Section II(A), titled "A New Age in Evolution," addresses natural selection, selective breeding, and also contains a general description of a genetically modified organism. Section II(B), titled "Creating and Testing GM Foods in the United States," briefly explains how scientists create GMOs and what testing GMOs are subject to. Section II(C), titled "The FDA and Food Safety," explains why the U.S. government created the FDA and how it changed the way America regulates food. Section II(D), titled "The History of Labeling in America," addresses the push by consumers for transparency of ingredients through labeling and also addresses The Fair Packaging and Labeling Act. Section II(E), titled "National Bioengineered Food Disclosure Law" addresses the current GM labeling law and its shortcomings. Section II(F), titled "GM Food Regulation Abroad" addresses the GM legislation of the European Union and Australia and explains how these countries legislation influenced this Note's proposed legislation.

The analysis section of this Note contains 5 subsections as well, which address the health concerns, environmental concerns, and religious concerns that support the consumer's moral right to know. Section III(A), titled "Proposed Legislation," presents legislation that would require the clear and transparent labeling of all genetically modified organisms. Section III(B), titled "Criticisms of Mandating the Labeling of GMOs," addresses the main critiques against the labeling of genetically modified organisms. Section III(C), titled "Human Health and GMOs," addresses the potential health concerns of glyphosate, a pesticide that Monsanto splices into the genetic material of the seeds they sell. The subsection also addresses the potential for genetically modified organisms to cause allergic reactions. Section III(D), titled "Environmental Concerns and GMOs," considers the negative environmental impacts of genetically modified crops in connection with increasing pesticide use, including soil depletion and contaminated groundwater. Finally, Section III(E), titled "Religious Concerns and GMOs," addresses the moral right to know in connection with religious faith as well as other ethical concerns, such as vegetarianism. Section III(E) also explains why religious values and concerns may reject the consumption of genetically modified organisms.

II. BACKGROUND

Consumers have had a leading role in the labeling of food products since the introduction of the Food and Drug Administration. Public outcry over the horrific conditions of the meat-packing industry in Chicago in the late-nineteenth and early twentieth centuries led to the reformation of the manufacturing and labeling industries in the United States.[40] Section II of this Note will walk readers through the history of genetic engineering, the formation of the Food and Drug Administration, and the history of labeling by the United States government in an effort to set up the claim that the FDA, rather than the USDA should be required to label all genetically modified foods in order to comply with the consumer's moral and legal right to know.

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[40] INSTITUTE OF MEDICINE, *Cattle Inspection*, 9 (1990), https://doi.org/10.17226/1588.

A. A New Age of Evolution

Before humans started controlling the evolution of plants and animals, there was a natural process of evolution that had been happening since the beginning of time, known today as natural selection.[41] The theory of natural selection was put forth by Charles Darwin, a naturalist and biologist of the mid-nineteenth century.[42] He explained natural selection as "a process that results in the survival and reproductive success of individuals or groups best adjusted to their environment, which in turn leads to the preservation and continuation of genetic qualities best suited to that particular environment."[43]

Over time, humans began to realize that they could selectively breed animals and plants in a way that would promote the reproduction of desired traits. This shift to intentional breeding led to a new form of controlled evolution, known as selective breeding.[44] Selective breeding was the first step in intentionally controlling the evolution of plants and animals, and has recently been succeeded by genetic engineering. Genetic engineering is a process, which alters the DNA of an organism by inserting foreign DNA material into the organism's genetic make-up, by using a variety of techniques derived from both genetics and biotechnology.[45] Humans have long been innovative when it comes to influencing the evolution of organisms.

There is ongoing international debate over the safety of genetically modified (GM) foods for human and environmental health. While some countries have enforced a total ban on GM foods, others have allowed citizens to cultivate and distribute GM foods in their respective country. Many countries that allow the cultivation and distribution of GM foods require mandatory centralized testing and labeling of GM food products. Section B of this Note will discuss the testing policies of GM foods in the United States and how these testing standards differ from other countries around the world.

B. Creating and Testing GM Foods in the United States

In order to understand why an environmentalist, or a religious sect may disapprove of eating genetically modified organisms, it is important to understand how scientists create genetically modified organisms. The following example will explain the process of genetically engineering a bacteria cell, which is a very common trait modified into seeds in order to heighten their resistance to disease, drought, and pests.[46] The first step of the engineering process requires scientists to find a gene that

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[41] *Natural Selection*, UNDERSTANDING EVOLUTION, https://evolution.berkeley.edu/evolibrary/article/evo_25.

[42] *Id*.

[43] MERRIAM-WEBSTER, *Natural Selection* (Last Visited Oct. 22, 2018), https://www.merriam-webster.com/dictionary/natural%20selection.

[44] *Natural Selection*, *supra* note 41.

[45] *Genetic Engineering*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/genetically%20engineered.

[46] MIAMI U., *Microbes and Genetic Engineering: How Does It Work*, http://www.cas.miamioh.edu/mbiws/geneticengineering/how.htm.

controls the trait they are interested in and collect this gene from the donor organism.[47] For example, one type of corn on the market is genetically modified with a protein called "Bt Delta Endotoxin," because it is highly effective at controlling caterpillar pests.[48]

Next, scientists isolate a plasmid, which is a small DNA molecule within a cell that can replicate independently.[49] Plasmid molecules carry genes that can benefit the survival of an organism, for example through antibiotic resistance.[50] The plasmid serves as a vector, carrying the beneficial gene to the new organism.[51] Next, the scientist will mix the donor DNA and the plasmid DNA with an enzyme, which will then cause a reaction cutting both kinds of DNA at special points along their code.[52] The pieces of cut DNA that have matching chemistry will then join together to make a completely new plasmid, which contains the new gene as part of its genetic make-up.[53] The plasmids containing the new gene are then mixed in with other bacterial cells which will use the process of transformation to take the newly constructed plasmids into their cells and so on and so forth.[54] Although there are slightly different methods of genetic engineering, the above example creates a good foundation for understanding the science behind genetically modified organisms.

In recent testimony before Congress, the FDA stated that it is "confident that the GE foods in the U.S. marketplace today are as safe as their conventional counterparts.[55] Following a similar sentiment, the National Academics of Science, Engineering, and Medicine issued a report on GM crops, concluding that there is no substantiated evidence that foods from GM crops are less safe than foods from non-GM crops.[56] Whereas some individuals contest that GM foods are associated with negative health or environmental effects, others are more skeptical, especially when it

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[47] *Id*.

[48] Ric Bessin, *Bt-Corn: What It Is and How It Works*, U. OF KY (Nov. 1999), https://entomology.ca.uky.edu/ef130.

[49] Supra, *note 46.*

[50] *Id*.

[51] *Id*.

[52] *Id*.
[53] *Id*.

[54] *Id*.

[55] FDA, *Statement of Michael M. Landa, J.D. Director of Center for Food Safety and Applied Nutrition Before the Subcommittee on Health* (Dec. 10, 2014), https://docs.house.gov/meetings/IF/IF14/20141210/102797/HHRG-113-IF14-Wstate-LandaM-20141210.pdf.

[56] Mark Lynas, *GMO Safety Debate Is Over*, CORNELL ALLIANCE FOR SCI. (May 23, 2016), https://allianceforscience.cornell.edu/blog/2016/05/gmo-safety-debate-is-over/ (citing NAT'L ACAD. OF SCI., ENGINEERING, AND MED., *Genetically Engineered Crops: Experiences and Prospects* (2016), https://doi.org/10.17226/23395).

comes to the testing of GM foods.[57] Robert Gould, M.D., who is the president of the board of Physicians for Social Responsibility stated, "The contention that GMOs pose no risks to human health can't be supported by studies that have measured a time frame that is too short to determine the effects of exposure over a lifetime."[58]

In the US, federal regulations require GM foods to be held to the same standards as their conventional counterparts. However, further testing into the safety of GM foods is not required, instead the process is voluntary.[59] Manufacturers and importers are responsible for ensuring the safety and proper labeling of GM products.[60] Although there are standards to refer to when testing genetically modified crops, the lack of standardization and enforcement in testing may raise honesty and transparency concerns due to bias and conflict of interest.[61] Michael Hansen, Senior Scientist and Advocacy Team Member at Consumer Reports, explained that "although in practice, companies generally do voluntary testing, there is no guarantee that they are doing the right sort of testing."[62] The companies carrying out the testing can carry out the same study over and over until they get results they like, and only show those favorable results to the FDA. In comparison, many countries around the world, including the European Union and Australia require the mandatory testing of GM foods to determine their safety for human and environmental health. In the EU as well as Australia, a governmental agency carries out the testing in a standardized format to ensure reliable and trustworthy results.

As noted in the "Introduction Section" of this Note, GM crops require a large amount of pesticides and herbicides because of the adaptation and ultimate resistance of surrounding pests and fauna. These crops continue to require higher levels of pesticide and insecticide use in order to maintain their healthy state, resulting in higher levels of exposure and residue levels than conventional crops.[63] The EPA is the regulatory agency responsible for setting the tolerance limits for residue of pesticides

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[57] *Id*.

[58] CONSUMER REP., *GMO Foods: What You Need to Know* (Feb. 26, 2015), https://www.consumerreports.org/cro/magazine/2015/02/gmo-foods-what-you-need-to-know/index.htm.

[59] *Id*., *See also* FDA, *Statement of Michael M. Landa, J.D. Director of Center for Food Safety and Applied Nutrition Before the Subcommittee on Health* (Dec. 10, 2014), https://docs.house.gov/meetings/IF/IF14/20141210/102797/HHRG-113-IF14-Wstate-LandaM-20141210.pdf ("Food growers, manufacturers, and distributors are responsible for taking the steps necessary to ensure that their food products marketed in the United States are safe. To help developers of food derived from GE plants comply with their obligations under the FD&C Act and FDA regulations, the Agency encourages them to participate in a voluntary consultation process with FDA prior to commercial distribution.").

[60] *Id*.

[61] Jessica Lau, *Different Policies: Regulating Genetically Modified Foods in the U.S. and Europe*, SITN (Aug. 9, 2015), sitn.hms.harvard.edu/flash/2015/same-science-different-policies/.

[62] Nathaniel Johnson, *The GM Safety Dance*, GRIST (July 10, 2013), https://grist.org/food/the-gm-safety-dance-whats-rule-and-whats-real/.

[63] Duke, *supra* note 20.

on and in food and animal feed. However, there are exemptions from this requirement, which further raises honesty and transparency issues. Heavy pesticide use in relation to GM crops is one area of concern among consumers today.[64] Because of this, the pesticide residue levels that accompany GM crops is one area of mandatory testing that should be required (without exemption) to be carried out in the United States in order to further support the consumer's moral right to know what is in the food they are consuming. [65] The proposed mandatory testing of GM crops will be discussed more fully in the Analysis Section of this Note.

C. The FDA and Food Safety

The Food and Drug Administration (FDA) is an agency within the U.S. Department of Health and Services and is responsible for overseeing the proper labeling and safety of food products within the United States.[66] The agency's origins began with the passage of the 1906 Pure Food and Drugs Act; a law that was created in order to prevent "the manufacture, sale, or transportation of adulterated or misbranded...foods, drugs, medicines, and liquors".[67] President Theodore Roosevelt signed the Act on June 30, 1906, the same day he signed into law the Federal Meat Inspection Act.[68] Upton Sinclair's book, *The Jungle*, which contained graphic descriptions of unsanitary conditions and vile practices that were normal within the meatpacking industry at the time, was a motivating factor in the creation of both Acts.[69] Sinclair's novel led to a public outcry for more sanitary conditions in manufacturing plants, especially those in Chicago's meat-packing industry, where Sinclair's novel was set.[70] After only a few months of discussion and revision, both bills were signed into law by President Theodore Roosevelt.[71]

The Pure Food and Drugs Act assigned the USDA's Bureau of Chemistry with the responsibility of examining food and drugs for adulteration and misbranding.[72] By

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[64] *Id*.

[65] Kimberly Kindy, *Pesticide levels on food unknown due to poor government testing*, THE WASH. POST (Nov. 7, 2014), https://www.washingtonpost.com/news/federal-eye/wp/2014/11/07/pesticide-residue-levels-on-food-is-unknown-due-to-poor-government-testing/?utm_term=.eaacac515891.

[66] Michelle Llamas, *Food and Drug Administration*, DRUG WATCH (May 15, 2018), https://www.drugwatch.com/fda/.

[67] *The Pure Food and Drug Act*, U.S. HOUSE OF REP. HIST. ART & ARCHIVES, https://history.house.gov/HistoricalHighlight/Detail/15032393280.

[68] Kristen L. Rouse, *Meat Inspection Act of 1906*, ENCYCLOPEDIA BRITANNICA (July 1, 2019), https://www.britannica.com/topic/Meat-Inspection-Act.

[69] Arlene Kantor, *Upton Sinclair and the Pure Food and Drugs Act of 1906*, AM. J. OF PUB. HEALTH 66.12 (1976): 1202-1205.

[70] Shinmin, Comment to *The Jungle and Public Outcry*, BRAINLEY, https://brainly.com/question/5950007

[71] *Id*.

[72] U.S. DEP'T OF AGRIC., *How Far Has Food Safety Come in 150 years*, https://www.fsis.usda.gov/wps/portal/informational/aboutfsis/history.

1927, the USDA's Bureau of Chemistry reorganized, and in 1931 it was renamed the Food and Drug Administration.[73] By the 1930s, consumers and federal regulators began to campaign for stricter and stronger regulatory authority, which led the enactment of the Food, Drug, and Cosmetic Act of 1938.[74] The new law significantly increased federal regulatory authority by mandating pre-market safety measures and new regulatory standards for foods. This law, although extensively amended, remains the central foundation of FDA regulatory authority to the present day.

The regulation of food in America began with the public's demand for transparency in the meat-packing industry. Today, that same demand for transparency is just as relevant and important as it was back then. Although conditions have improved exponentially since the early 1900s, the consumer's desire to know what is in their food has remained. Many consumers stipulate that "the labeling of genetically modified organisms is a necessary component in making an informed decision."[75] The legal enforcement and regulation of food within the United States has promoted better food standards and practices throughout the country, which will only continue to improve as the FDA continues to implement new regulatory schemes. In order to promote the consumer's moral and legal right to make an informed decision, the FDA should be delegated the responsibility to draft regulations which require the transparent labeling of all GM products.

D. The History of Labeling Food in America

The creation of the Food and Drug Administration was a building block that helped lay the foundation for the labeling of food products in the United States. Although the

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[73] *Id*.

[74] *Id.*

[75] Chelsea Harvey, *People want GMO food labeled*, THE WASH. POST (July 21, 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/07/21/people-want-gmo-food-labeled-which-is-pretty-much-all-they-know-about-gmos/?utm_term=.aa51ca2a91a9 (A recent survey conducted by researchers from the University of Pennsylvania and the University of Wisconsin suggests that most Americans support mandatory labeling laws – 88% of participants said they thought products containing GMOs should be labeled, and 91% said they thought people had a right to know if they were buying or eating products containing GMOs); *see* Niraj Chokshi, *GMO labeling measure makes Colorado's November ballot*, THE WASH. POST (Aug. 20, 2014), https://www.washingtonpost.com/blogs/govbeat/wp/2014/08/20/gmo-labeling-measure-makes-colorados-november-ballot/?utm_term=.d6675c9a57c9 (A proposal to require the labeling of GM food qualified for Colorado's November ballot, with nearly 40,000 more signatures than required to back the Proposition); *see* Amy Harmon and Andrew Pollack, *Battle Brewing Over Labeling of Genetically Modified Food*, THE N.Y. TIMES (May 24, 2012), https://www.nytimes.com/2012/05/25/science/dispute-over-labeling-of-genetically-modified-food.html (According to a 2010 Thomson Reuters – NPR poll, about 9 in 10 Americans said that they wanted genetically engineered food to be labeled); *see* Allison Kopicki, *Strong Support for Labeling Modified Foods*, THE N.Y. TIMES (July 27, 2013), https://www.nytimes.com/2013/07/28/science/strong-support-for-labeling-modified-foods.html?_r=0; *see also U.S. Polls on GE Food Labeling*, THE MELLMAN GROUP (Nov. 23, 2015), https://www.centerforfoodsafety.org/issues/976/ge-food-labeling/us-polls-on-ge-food-labeling.

early consumer laws of the United States enabled the government to go to court against illegal products, the laws lacked affirmative requirements that would enforce compliance.[76] The first step in enforcing consumer rights in the United States came in 1913, when the Sixty-Second Congress enacted the Gould Amendment.[77] The Gould Amendment pioneered the labeling of food, drug, medicine, and liquor products in the United States because it required the packages of these products to be plainly marked on the outside in terms of weight, measure, and numerical count.[78] Years passed before the enforcement of food and drug safety laws were widely enforced in the country. Even by the late 1940s, consumer laws did not require manufacturers to show that food ingredients were safe, they only prohibited the use of poisonous substances.[79] In the mid to late 1950s the character of food and drug law in the United States drastically changed through the enactment of three amendments: The Pesticide Amendment of 1954[80], The Food Additives Amendment of 1958[81], and The Color Additive Amendments of 1960.[8283] For the first time, United States law required food products to be determined safe before entering the market.[84]

Whereas past consumer laws relied on the deterrence of bad practices through court proceedings, the trend towards preventative lawmaking in the 1960s relied on regulations to control the manufacturing and marketing of consumer products.[85] Multiple factors controlled this growth in legislation, including the urbanization and surge of impersonal markets, the technological changes in food products (such as canning), and also the altering of food through the introduction of preservatives.[86] The

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[76] Wallace F. Janssen, *The Story of the Laws Behind the Labels*, FDA CONSUMER MAGAZINE (June 1981).

[77] *Id*.

[78] 62 P.L. 419, 37 Stat. 732, 62 Cong. Ch. 117

[79] Janssen, *supra* note 76.

[80] The PCA of 1954 established safety limits for pesticide residues on food. It authorized the FDA to ban pesticides they determined to be unsafe as well.

[81] The Food Additives Amendment of 1958 is an amendment to the US Food, Drugs, and Cosmetic Act. The Amendment requires food additives to be tested before they can be regarded as safe by the US government. The Amendment includes the Delaney clause, a provision which prohibits the use of substances found to cause cancer in man or animal to be used as food additives.

[82] The Color Additive Amendment of 1960 regulates the packaging, labeling, and safety evaluation of colored additives.

[83] *Id*.

[84] *Id*.

[85] *Id*.

[86] Marc Law, *History of Food and Drug Regulation in the United States*, EH.NET ENCYCLOPEDIA (Oct. 11, 2004), http://eh.net/encyclopedia/history-of-food-and-drug-regulation-in-the-united-states/.

abundance of consumer's that currently demand the clear labeling of all GM food products further enforces the trend towards preventive lawmaking in the United States.

E. Previous Proposed Legislation

Safety is only one of the concerns consumers may have when it comes to genetically modified organisms. Other interests, such as environmental concerns and ethical or religious concerns may prevent individuals from wanting to consume products that contain genetically modified organisms. In one survey, published by the New York Times, 93% of adults in the United States believed food labels should identify when genetically modified organisms are present.[87] The desire for labeling genetically modified organisms does not rest with the public alone. Multiple legislators have proposed regulations that would require labeling of genetically modified organisms.[88]

In April of 2013, California Senator Barbara Boxer and Oregon Representative Peter DeFazio sponsored "The Genetically Engineered Food Right-to-Know Act (GERKA)."[89] The bill would have required food manufacturers to clearly label any product that has been genetically modified or contains genetically modified ingredients, or else the product would be classified as "misbranded" by the FDA.[90] The bill did not gather enough support, and failed to become a law.[91]

In July of 2016, Senators Pat Roberts and Debbie Stabenow also crafted a bill which creates a national standard for labeling food made with genetically modified

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[87] Allison Kopicki, *Strong Support for Labeling Modified Foods*, THE N.Y. TIMES (July 27, 2013), https://www.nytimes.com/2013/07/28/science/strong-support-for-labeling-modified-foods.html?_r=0; *see* also *U.S. Polls on GE Food Labeling*, THE MELLMAN GROUP (Nov. 23, 2015), https://www.centerforfoodsafety.org/issues/976/ge-food-labeling/us-polls-on-ge-food-labeling.

[88] Dianne Lugo, *U.S. Senate passes GM Food Labeling Bill*, SCI. MAG. (July 8, 2016, 3:45 PM), https://www.sciencemag.org/news/2016/07/us-senate-passes-gm-food-labeling-bill (The U.S. Senate has passed, by a vote of 63 to 30, a bill that would create a national standard for labeling food made with genetically modified organisms); *see* Noah Berger, *Congress Passes GMO Food Labeling Bill*, NBS NEWS (July 14, 2016, 4:40 PM), https://www.nbcnews.com/health/health-news/congress-passes-gmo-food-labeling-bill-n609571 (Congress sent legislation to President Barack Obama on Thursday that would require most food packages to carry a text label, a symbol or an electronic code readable by smartphone that indicates whether the food contains genetically modified ingredients, or GMOs).

[89] *GMO Labeling Bill Introduced in Congress*, AHN-USE (Apr. 30, 2013), http://www.anh-usa.org/gmo-labeling-bill-introduced-in-congress/.

[90] Accurate Labels Act of 2018, H.R. 6022, 155th Cong.

[91] *Lawmakers Reintroduce Bill to Label Genetically Engineered Food*, FOOD SAFETY NEWS (Feb. 13, 2015), https://www.foodsafetynews.com/2015/02/lawmakers-reintroduce-bill-to-label-genetically-engineered-food/.

organisms.[92] The legislation blocks states, such as Vermont[93], from issuing mandatory labeling laws and require food manufacturers to use one of three different labels to inform consumers of the presence of genetically modified organisms, including: a USDA symbol, plain language, or a readable QR code that links to ingredient information.[94] The Senate passed the legislation by a vote of 63 to 30[95] and the House passed the legislation with a vote of 306-117.[96] In August of 2016 President Obama signed the National Bioengineered Food Disclosure Standard into law and in December of 2018 the USDA released the final regulations for implementation of the Food Disclosure Standard.

Although this has been a productive step for proponents of GM labeling, in reality the regulations do little to help consumers make informed decisions in relation to GM food products. For example, the regulations exempt foods produced with GMOs if the food products only contain highly refined GMO sugars and oils.[97] The Environmental Working Group is a non-profit organization in the U.S. that specializes in research and advocacy in the environmental sector.[98] In a 2018 study, EWG found that over 10,000 GM food products will be exempt from the new GMO disclosure law because they only contain GMO ingredients from highly refined sugars and oils.[99] In other words, around 1 in 6 food products in the grocery store will be exempt from the disclosure requirements. The regulations also exempt products from the disclosure requirement when the GMO ingredients make up less than 5 percent of the product by weight.[100] Many thickening agents, colorants, flavorings and emulsifiers are derived from corn and soybean GM crops.[101] These ingredients often appear in low levels at the bottom

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[92] Lugo, *supra* note 88.

[93] Greg Jaffe, *The ABCs of GMO Disclosure in the United States*, CTR. FOR SCI. IN THE PUB. INT. (Sept. 25, 2017), https://cspinet.org/news/abcs-gmo-disclosure-united-states-20170925.

[94] *Id*.

[95] *Id.*

[96] Noah Berger, *Congress Passes GMO Food Labeling Bill*, NBS NEWS (July 14, 2016, 4:40 PM), https://www.nbcnews.com/health/health-news/congress-passes-gmo-food-labeling-bill-n609571

[97] Colin O'Neil & Sean Perrone-Gray, *EWG Analysis: Loophole Could Exempt Over 10,000 GMO Foods from Disclosure Law*, EWG (June 29, 2018), https://www.ewg.org/agmag/2018/06/ewg-analysis-loophole-could-exempt-10000-gmo-foods-disclosure-law.

[98] *About Us*, THE ENVTL. WORKING GROUP (Last Visited Aug 21, 2019), https://www.ewg.org/about-us.

[99] O'Neil *supra* note 97.

[100] *Id*.

[101] *Id*.

of ingredient lists, which means that the GMO ingredients in thousands of foods will fall below the 5 percent exemption.[102]

In addition, instead of requiring clear, on-package labeling in the form of text or a symbol, the final regulation allows manufactures to use QR codes to disclose GM content in food products.[103] QR codes are encoded images on a package that must be scanned, which requires a smartphone and internet connection. The USDA's own study found that QR codes are inherently discriminatory against those Americans who do not own a smartphone or those without access to the internet, which include predominantly low-income earners, rural residents, and Americans over the age of 65.[104] The study found that many consumers are unfamiliar with QR codes and would not know that the digital code contains food information.[105] In addition, many of the smartphone applications that scan QR codes are not intuitive and often include pop-up ads, causing consumer confusions.[106] Even if consumers have a smartphone, they may be unable to connect to broadband, or may connect at a speed that is so slow that they cannot load information.[107] In the United States, there has never been a food labeling requirement met by QR codes instead of on-package labeling. This Note proposes that the FDA should be delegated the authority to promulgate new regulations which require the labeling of all GM products in a clear and transparent format.

F. GM Food Regulation Abroad

There are currently 65 countries that require the labeling of GM foods.[108] Of concern in this Note are EU Member States and Australia. Although each entity follows a similar rhetoric in their labeling and testing requirements, there are some differences between each. This Section will address the regulatory requirements of the EU and Australia as well as the reports and studies that prompted the mandatory labeling and testing of GM products.

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[102] *Id*.

[103] Lauren Bradford, *To Scan or Not to Scan*, U. OF DEL. (June 3, 2019), https://www.udel.edu/udaily/2019/june/kent-messer-qr-code-oysters-consumer-habits/.

[104] Deloitte, *A Third-Party Evaluation of Challenges Impacting Access to Bioengineered Food Disclosure*, USDA (July 2017), https://www.ams.usda.gov/sites/default/files/media/USDADeloitteStudyofElectronicorDigitalDisclosure20170801.pdf.

[105] *Id*.

[106] *Id*.

[107] *Id*.

[108] *How are GMOs labeled around the world*, GENETIC LITERACY PROJECT (Last Visited Aug. 21, 2019), https://gmo.geneticliteracyproject.org/FAQ/how-are-gmos-labeled-around-the-world/.

1. The European Union [109]

Beginning in the late 1940s, countries throughout Europe began creating and joining multi-state treaties in order to enforce peace and stability throughout Europe as an antidote to the perils faced by Europeans during WWII.[110] Over the next 50 years, countries throughout Europe continued to join and create treaties of this type, which ultimately resulted in the creation of the European Union (EU).[111] Today, the EU is a unique economic and political union between 27 countries (Member States).[112] The EU is responsible for establishing policies through regulations, directives, decisions, and recommendations, which ultimately control the national laws of the Member States.[113] Regulations hold the most power because they take effect in every Member State as they stand.[114] In comparison, a directive is an instruction that each Member State must follow when making their own laws, but each Member State may itself choose how to implement the directive.[115] The EU has provided regulations, as well as directives in formulating its GMO legislation.

In 2002, the European Commission, which is the executive cabinet of the European Union (EU), established its general policy for genetically modified food regulation.[116] The EU holds the position that potential risks of GM products are not completely known due to their brief history,[117] and because of this, the EU's regulatory decisions err on the side of caution and require a high burden of proof for product safety as well as strict requirements for GM food labeling.[118] Specifically, food products containing

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[109] The European Union, in their supportive material explains that GM labeling is mandatory in the EU because it provides information for consumers and allows them to make an informed choice. They use a 0.9% ceiling because of the unknown long-term effects that GMOs have on the environment and human health. Whereas the US focuses a lot on human health and GMOs, the EU focuses on human health and the environment. This extra element is one of the driving forces behind their strict GMO regulations. Although human health concerns are contested between proponents and opponents of GMOs, environmental concerns from GMOs are more readily apparent.

[110] Robert Wilde, *The History of the European Union*, THOUGHTCO. (Sep. 27, 2018), https://www.thoughtco.com/the-history-of-the-european-union-1221595.

[111] *Id.*

[112] *Id.*

[113] *Main Characteristics of the European Union's Legal System,* EUROPEAN PARLIAMENT (Last Visited Mar 24, 2019), http://www.europarl.europa.eu/unitedkingdom/en/education/teachingresources/howeuworks/legalsystem.html.

[114] *Id.*

[115] *Id.*

[116] Jessica Lau, *Different Policies: Regulating Genetically Modified Foods in the U.S. and Europe*, SITN (Aug. 9, 2015), sitn.hms.harvard.edu/flash/2015/same-science-different-policies/

[117] *Id.*
[118] *Id.*

more than 0.9% of GM material require GM labeling.[119] The Note's proposed legislation also suggests the use of a 0.9% ceiling within its labeling requirements instead of the current 5% ceiling.

EU GMO legislation includes Directive 18 (on the deliberate release of GMOs into the environment), Regulation 1829 (on genetically modified food and feed), Directive 412 (regarding the possibility for Member States to restrict or prohibit the cultivation of GMOs in their territory), and Regulation 1830 (concerning the traceability and labeling of GMOs).[120] Of concern in this Note is Regulation 1830 as well as Directive 412. Regulation 1830 ensures the traceability of GMOs by requiring producers and distributors (operators) to pass on in writing the GMOs present in their products.[121] The ability to track GMOs throughout their journey helps to ensure safety and compliance in the GM food arena. Regulation 1830 requires each operator to, 1) keep a record of products that contain GMOs for 5 years, and 2) be able to identify the operator from whom they bought the products and the one to whom he or she supplied them.[122] In general, final consumer packaging or pre-packaged products containing GMOs require the label to state, "This product contains genetically modified organisms.[123]" As mentioned above, there is an exemption from mandatory labeling for products that contain below 0.9% of genetically modified DNA.[124] Regulation 1830 also requires Member States to carry out inspections and sample tests to ensure compliance.[125] Each Member State must also impose effective penalties for infringement of the Regulation.[126]

In the EU, all GM food products must go through a centralized testing process for premarket approval.[127] GM crops require a thorough risk assessment by the European Food Safety Authority (EFSA) before Member States can cultivate and distribute them.[128] EFSA is a European agency funded by the EU that operates independently of the European legislative and executive institutions.[129] Regulation 178 (General Food Law Regulation) of the EU, passed in 2002, created the EFSA to be a source of scientific advice and communication on risks associated with genetically modified

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[119] *Id.*

[120] *Id.*

[121] Regulation (EC) No 1830/2003 of Sept. 2003.

[122] *Id.*

[123] *Id.*

[124] *Id.*

[125] *Id.*

[126] *Id.*

[127] *Id.*

[128] *About EFSA*, EUROPEAN FOOD SAFETY AUTHORITY (Last Visited Mar. 15, 2019), http://www.efsa.europa.eu/en/aboutefsa.

[129] *Id.*

food.[130] The EFSA is responsible for risk assessment and has a duty to communicate its scientific findings to the public at large.[131] Overall, the EFSA works to ensure consistency in testing genetically modified food.[132] This Note's legislation is modeled after the EFSA, and requires the USDA to create an independent agency, responsible for 1) assessing environmental and health risks associated with GM foods and 2) implementing standardized testing measures before approving GM crops for cultivation.

Currently, the EU authorizes only one GM crop for cultivation in the EU, a strain of corn known as MON 810, produced and distributed by Monsanto.[133] Portugal, Spain, Czech Republic, Slovakia, and Romania are the only Member States that cultivate MON810.[134] On January 13, 2015, the European Parliament adopted Directive 412, which allows Member States to restrict/ban the cultivation of crops containing GMOs on their own territory.[135] To date, 18 Member States have completely banned the use of GM crops within their country including (but not limited to), Austria, Denmark, France, Germany, Greece, Italy, Lithuania, Luxembourg, the Netherlands, Poland, and Slovenia.[136]

2. Australia

The Parliament of Australia is the legislative branch of the government of Australia, and therefore makes the laws by that the States and Territories of Australia abide by.[137] In 2000, the Parliament of Australia signed the inter-governmental Gene Technology Agreement, which recognizes the need to ensure a consistent national scheme for the regulation of gene technology.[138] The Agreement has two components: The Gene Technology Act of 2000 (GTA) and the Gene Technology Regulations of 2001 (GRA).[139] The purpose of both is to protect the health and safety of people and

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[130] *Id.*

[131] *Id.*

[132] *Id.*

[133] Jeremy Smith, *More EU states wary on GMO maize*, REUTERS (June 5, 2007), https://www.reuters.com/article/us-gmo-eu-bans/more-eu-states-wary-on-gmo-maize-idUSL0557943220070605.

[134] *Id.*

[135] Council Directive (EU) 2015/412.

[136] Andy Coghlan, *More than half of EU officially bans genetically modified crops*, NEW SCIENTIST (Oct. 5, 2015), https://www.newscientist.com/article/dn28283-more-than-half-of-european-union-votes-to-ban-growing-gm-crops/; *see also* Alexandra Sifferlin, *Over Half of E.U. Countries Are Opting out of GMOs*, TIME (Oct. 3, 2015), http://time.com/4060476/eu-gmo-crops-european-union-opt-out/.

[137] *About Parliament: Work of the Parliament*, PARLIAMENT OF AUSTRALIA (Last Visited Mar. 24, 2019), https://www.aph.gov.au/About_Parliament.

[138] *Gene Technology Act 2000*, PARLIAMENT OF AUSTRALIA (Last Visited Mar. 24, 2019), https://www.legislation.gov.au/Details/C2016C00792.

[139] *Id.*

the environment by identifying risks associated with gene technology and managing identified risks by regulating GMOs. [140]

The GTA has multiple components that work together to regulate the testing and risk assessment associated with GMOs. First, the GTA established the Office of the Gene Technology Regulator (OGTR) under the Australian Government's Department of Health.[141] The current Regulator, Dr. Raj Bhula, is responsible for administering the national regulatory system for gene technology as set out in the GTA.[142] She manages a department that performs risk assessment, develops policy guidelines and codes of practice, issues technical and procedural guidelines, and provides information to the public about GMOs.[143] The GTA also establishes an advisory committee of experts, which help advise the Regulator about the risks associated with GMOs.[144] Finally, the GTA created a centralized, publicly available database of all GMOs and GM products approved in Australia.[145] This portion of the GTA inspired a part of the legislation in this Note in the hopes that a centralized, publicly-available database will promote compliance with testing and certification requirements.

Food Standards of Australia New Zealand (FSANZ) is a statutory authority within the Australian Government's Department of Health that is responsible for developing food standards for Australia and New Zealand, including the labeling of GMOs. FSANZ requires Australian and New Zealand distributors to label GM foods and ingredients (including food additives and processing aids) that contain novel DNA or novel protein with the words 'genetically modified'. According to Standard 1.5.2 of the Food Standards Code, "Novel DNA and novel protein mean DNA or protein which, as a result of the use of gene technology, is different in chemical sequence or structure from DNA or protein present in counterpart food that has not been produced using gene technology."[146] Labeling is also required for GM foods that have an altered characteristic, such as an altered nutritional profile, when compared to their conventional counterpart.[147] Similar to EU legislation, labeling is not required when there is no more than 1% (0.9% in the EU) of genetically modified DNA in what would otherwise be a non-GM food.

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[140] *Id.*

[141] Office of the Gene Technology Regulator, *About the Regulator*, AUSTRALIAN GOV'T DEP'T OF HEALTH (Nov. 8, 2016), http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/about-regulator-1.

[142] *Id.*

[143] *Gene Technology Act 2000*, PARLIAMENT OF AUSTRALIA (Last Visited Mar. 24, 2019), https://www.legislation.gov.au/Details/C2016C00792.

[144] *Id.*

[145] *Id.*

[146] *Genetically modified (GM) food labelling*, FOOD STANDARDS AUSTL. N.Z. (Sep. 2016), http://www.foodstandards.gov.au/consumer/gmfood/labelling/Pages/default.aspx.

[147] *Id.*

III. ANALYSIS

The consumer's moral and legal right to know is the driving factor behind the Note's proposed legislation. Although a system has recently been put into place, the system will leave out thousands of GM products that are on the shelves of U.S. grocery stores and those that are labeled will still mislead those who do not have access to a QR code scanner. The analysis portion of this Note goes into the moral issues individuals have with GM foods and why these moral concerns spark the consumer's right to know.

Before going into the reasoning, it is necessary to set up the proposed legislation for the labeling of genetically modified organisms. The proposed legislation in this Note relies heavily upon the regulatory language of other countries and governmental bodies including the European Union and Australia. Both governmental bodies currently have provisions within their legal system that require strict labeling of genetically modified organisms. The proposed legislation is not exhaustive; instead it lays out the foundation, which encompasses the necessary objectives, scope, and requirements that are fundamental to the labeling of genetically modified organisms.

A. Proposed Legislation

Article I: Objective

The objective of this Legislation is to:

(a) ensure the protection of human life and health and consumer interests in relation to genetically modified food

(b) delegate the responsibility of testing and certifying the use of genetically modified crops for cultivation and distribution to the USDA-APHIS

(c) lay down standard procedures that the EPA must comply with for the mandatory testing of residue levels on genetically modified food, including:

(i) random sampling; and

(iii) evaluating and adjusting residue ceiling set every 5 years

(d) lay down provisions for the mandatory labeling of genetically modified food.

Article II: Definitions

1. "genetically modified food" means food containing, consisting of or produced from genetically modified organisms (hereinafter GM food)

Article III: Scope

1. This Section shall apply to:

(a) Genetically modified organisms for food use

(b) All food containing or consisting of genetically modified organisms over the ceiling limit of .09%

(c) Food produced from or containing ingredients produced from genetically modified organisms over the ceiling limit of .09%

Article IV: Requirements

1. Food referred to in Article 3(1) must not:

(a) have an adverse effect on human health or the environment;

(b) mislead the customer

(c) or differ from the food which it "replaces" to such extent that its normal consumption would be nutritionally disadvantageous for the consumer.

2. The USDA shall be responsible for setting up an independent group within the Animal Health and Inspection Service (APHIS) that is responsible for testing and certifying GM food. The agency must:

(a) create a standard set of procedures for testing all new genetically modified crops
(b) certify GM crops before cultivation
(c) communicate scientific findings with the public at large by establishing a centralized, publicly available database of all GMOs and GM products approved in the United States
(d) conduct annual risk assessment projects for human and environmental health in connection with GM crops
(e) disallow complete exemptions

3. Without prejudice to the other requirements of law concerning the labeling of foodstuffs, food falling within the scope of Article III shall be subject to the following labeling requirements, under the control of the FDA:

(a) where the food consists of more than one ingredient, the words "genetically modified" or "produced from genetically modified (name of the ingredient) shall appear in the lists of ingredients in parentheses immediately following the ingredient concerned;
(b) where there is no list of ingredients, the words "genetically modified" or "produced from genetically modified (name of organism)" shall appear clearly on the labeling; and
(c) where the food offered for sale to the final consumer is non-pre-packaged food, the information required under this paragraph must permanently and visibly be on the food display, in a standardized font determined sufficiently large enough
(d) QR codes violate Article IV, §1(b) of this legislation due to their lack of transparency and therefore, are not acceptable forms of labeling for genetically modified organisms.

4. In addition to the labeling requirements in paragraph 2, the labeling shall also mention the following information:

(a) where a food is different from its conventional counterparts as regards the following characteristics:
(i) nutritional value
(ii) potential for allergic reaction

B. Criticisms of mandating the labeling of GMOs

A large reason why GM legislation took much longer to pass in the United States than in other areas of the world has to do with the varying views among scientists, politicians, and the public. The basic reasoning behind why the United States did not regulate the labeling of genetically modified organisms was because 9/10 scientists consider them to be the same as their conventional counterparts.[148] Scientific research

[148] MONSANTO, *Commonly Asked Questions about the Food Safety of GMOs,*

thus far has deemed genetically modified foods safe to eat. A study by Penn State found that while 88% of scientists believe genetically modified organisms are safe to eat, only 37% of the American public believes they are safe to eat.[149] The public's distrust of genetically modified organisms is attributable to their short history and lack of long-term testing.

Scientific research is not the only reason why the United States hesitated to label genetically modified organisms. Manufacturers worry that the labeling of genetically modified organisms will project a negative connotation and further mislead the public into thinking these products were unsafe.[150] This may be one reason for allowing QR codes as an alternative to clear and transparent labeling. A study from the University of Vermont found that disclosures on labels can actually improve consumer attitudes toward genetically modified food.[151] Vermont is the only U.S. state to have implemented a mandatory labeling policy.[152] The study compared levels of consumer opposition to genetically modified foods in Vermont, before and after the enactment of legislation requiring the labeling of genetically modified organisms.[153] The analysis showed opposition to genetically modified food fell by 19% in Vermont after the implementation of mandatory labels.[154] Vermont's legislation was overturned in 2018 when President Obama signed legislation requiring a national standard for labeling food made with genetically modified organisms.[155]

C. Human Health and GMOs

As discussed in section I and section II of this note, genetically modified organisms have an intertwined relationship with the heavy use of pesticides. Pesticides, which contain high levels of chemicals have many negative implications on human health. This, combined with their potential to offset unexpected allergic reactions supports the proposition that consumers have the moral and legal right to know what is in their food products and therefore, The FDA should mandate the clear and transparent labeling of all genetically modified foods to protect this right.

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https://monsanto.com/company/commitments/safety/statements/are-gmos-safe/.

[149] Sara LaJeunesse, *The Science of GMOs*, PENN. STATE (2015), https://agsci.psu.edu/magazine/articles/2015/spring-summer/the-science-of-gmos.

[150] Sarah Berger, *GMO Labeling*, INT'L BUS. TIMES (Feb. 26, 2016, 8:27 AM), https://www.ibtimes.com/gmo-labeling-should-food-packaging-identify-genetically-modified-organisms-2323657.

[151] *Mandatory Labels Reduce GMO Food Fears*, U. OF VT. (June 27, 2018), https://www.sciencedaily.com/releases/2018/06/180627160520.htm.

[152] VERMONT ATTORNEY GENERAL OFFICE, *Consumer Protection Rule 121 - Labeling Foods Produced with Genetic Engineering* (Effective Date July 1, 2016), https://ago.vermont.gov/wp-content/uploads/2018/03/CP-Rule-121.pdf.

[153] *Supra* note 151.

[154] *Id*.

[155] Stephen Dinan, *Obama Signs Bill Overturning Vermont's GMO Labeling Law*, THE WASH. TIMES (Aug. 2, 2016), https://www.washingtontimes.com/news/2016/aug/2/obama-signs-bill-overturning-vermonts-gmo-labeling/.

1. Pesticides, Human Health, and GMOs

Although pesticides have positive aspects, such as their ability to control disease and promote growth, the negative health effects that they can create when consumed in small amounts over a long period of time are daunting. Studies have linked pesticides to a variety of chronic health conditions including, but not limited to, diabetes,[156] cancer, neurological defects such as Alzheimer's and Parkinson's,[157] increased infertility in women, and developmental problems in children.[158] Health conditions caused by pesticide exposure are expected to continue to increase as pesticide use grows. Pesticide use has risen by 21% in the United States since the introduction of genetically modified organisms.[159]

Under the Food Quality Protection Act (FQPA), the EPA must ensure that all pesticides used on food in the United States meet FQPA's safety standards.[160] Before allowing the use of a pesticide on food crops, EPA sets a maximum legal residue limit for each treated food. [161] Every fifteen years, the EPA sets new limits based on new scientific research into the negative impacts pesticides have on human health.[162] The last time the EPA evaluated its residue levels was in 2007, when genetically modified organisms had not yet grown a tolerance to pesticide use.[163] The EPA needs to carry out new research to determine the negative impacts of the much higher residue levels that genetically modified crops are subject to today. Furthermore, the Government Accountability Office in a report in 2014 criticized the EPA's sampling program for pesticide residue testing, stating that it was not statistically valid because it targeted foods previously shown to have lower residue levels.[164] By selecting the same crops

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[156] Robin Mackar, *Long-Term Pesticide Exposure May Increase Risk of Diabetes*, NAT'L INST. OF ENVTL. HEALTH SERVICES (June 4, 2008, 12:00 PM), https://www.niehs.nih.gov/news/newsroom/releases/2008/june04/.

[157] Arthur Fitzmaurice, *Pesticides Associated with Parkinson Disease*, AM. ACAD. OF NEUROLOGY (Feb. 3, 2014), http://n.neurology.org/content/82/5/419.

[158] Jennifer Hsaio, *GMOs and Pesticides: Helpful or Harmful*, SITN HARVARD (Aug. 10, 2015), http://sitn.hms.harvard.edu/flash/2015/gmos-and-pesticides/; *see* David Bellinger, *A Strategy for Comparing the Contributions of Environmental Chemicals to Neurodevelopment of Children*, ENVTL. HEALTH PERSPECTIVES (Dec. 19, 2011), https://ehp.niehs.nih.gov/doi/10.1289/ehp.1104170.

[159] Danny Hakim, *Doubts About the Promised Bounty of Genetically Modified Crops*, THE N.Y. TIMES (Oct. 29, 2016), https://www.nytimes.com/2016/10/30/business/gmo-promise-falls-short.html?_r=0.

[160] *Food and Pesticides*, U.S. EPA (Last Visited Oct. 23, 2019), https://www.epa.gov/safepestcontrol/food-and-pesticides.

[161] *Id.*

[162] *Id.*

[163] Gretchen Goetz, *GAO Finds Fault with Government Testing for Pesticide Residues*, FOOD SAFETY NEWS (Nov. 10, 2014), https://www.foodsafetynews.com/2014/11/gao-finds-fault-with-government-tests-for-pesticide-residues/.

[164] *Id.*

year after year, companies who test residue levels are able to control the outcome of the test results, often educing misleading results.[165]

The negative health effects that accompany pesticide use, coupled with the rising use of pesticides, especially in relation to genetically modified crops, is a major concern for many individuals. By requiring the FDA to label genetically modified organisms, consumers will be able to make an informed decision about what they are putting into their body. Currently, organic products are the only products in the U.S. market guaranteed not to contain traces of pesticides.[166] Because of this, consumers that buy conventional products remain in the dark when it comes to the traces of chemicals in their products. In order to address this problem, Article I(b) of the proposed legislation found in section III(A) of this Note, calls for a new standard procedure, which requires the mandatory testing of residue levels on genetically modified food.

2. Allergies and GMOs

Another health concern associated with genetically modified organisms is the potential for unforeseen allergic reactions. There is a possibility that introducing a gene into a plant may create a new allergen or cause an allergic reaction in certain individuals. In 1996, researchers found that the main allergen from Brazil nuts retained its allergenicity even after transferred into a genetically modified soybean.[167] Although the modified soybean did not receive approval for the market, the case established the health dangers that can accompany the transfer of genetic material from one organism to another. Individuals exhibit different levels of severity to allergies and because of this their highest risk often comes from accidental ingestion.[168] Knowing the composition of food products can aid consumers in making choices that will protect them from suffering accidental allergic reactions. By labeling genetically modified organisms, individuals can make informed decisions to protect themselves from harmful allergens. The labeling of genetically modified organisms may also facilitate the recall process of food products that produce widespread allergic reaction.[169] Article IV(3)(A)(ii) of the proposed legislation in section III(A) of this Note, addresses the issue of allergic reaction by requiring foods that are different from their conventional counterparts to have an extra warning where there is potential for an allergic reaction to occur.

D. Environmental Concerns and GMOs

Many individuals change their habits based on their concern for their environment. For example, some people bike to work instead of drive to reduce their carbon

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[165] *Id.*

[166] *Is Organic Always GMO Free*, GMO AWARENESS (May 5, 2011), https://gmo-awareness.com/2011/05/05/is-organic-always-gmo-free/.

[167] Charles Xu, *Nothing to Sneeze at: the Allergenicity of GMOs*, HARVARD U. (Aug. 10, 2015), http://sitn.hms.harvard.edu/flash/2015/allergies-and-gmos/.

[168] *Id.*

[169] *Id.*

footprint, while others reduce the amount of time they spend in the shower to preserve fresh water resources. Environmental concerns are another important reason why consumers may want to know that their products contain genetically modified organisms. The heavy use of pesticides associated with genetically modified organisms can have effects on multiple areas of the environment, including but not limited to: soil composition, contaminated groundwater, biodiversity and pest resistance. This section will address the environmental concerns that surround genetically modified organisms and how these concerns support the clear and transparent labeling of all GM foods.

Toxicity is a large issue that surrounds the use of chemical pesticides. As mentioned previously in this Note, genetically modified organisms are parallel with heavy pesticide use, a phenomenon that only continues to worsen with time. The toxicity of pesticides, coupled with their heavy use, kills organisms that assist in binding soil together.[170] The chemicals present in pesticides also kill beneficial bacteria and other micro-organisms that aid in soil recuperation.[171] By killing these organisms, the soil begins to degrade, which can be irreversible in some instances.[172] Soil degradation refers to the decline in soil quality including the soil's physical, biological and chemical state.[173] The decline in soil quality leads to a decline in the soil's fertility, acidity, salinity, rate of erosion, and more.[174] Often, soil degradation results in unusable farmland that produces a declining number of crops year after year.[175]

The main pesticide used on genetically modified organisms is Monsanto's Roundup Ready product.[176] The active ingredient found in Roundup Ready is known as glyphosate, which is a non-selective herbicide.[177] A study conducted in 2011 found that glyphosate was making its way into groundwater across the nation through the contamination of aquifers, wells, and springs.[178] The increase of glyphosate in groundwater has a direct link to genetically modified organisms. Monsanto, which is a giant biotechnology corporation, is the world's largest provider and producer of

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[170] Rinkesh, *What is Soil Degradation*, CONSERVE ENERGY FUTURE (Last Visited Oct. 23, 2019), https://www.conserve-energy-future.com/causes-effects-solutions-soil-degradation.php.

[171] *Id.*

[172] *Id.*

[173] *Id.*

[174] *Id.*

[175] *Id.*

[176] Jordan Wilkerson, *Why Roundup Ready Crops Have Lost their Allure*, HARVARD U. (Aug. 10, 2015), http://sitn.hms.harvard.edu/flash/2015/roundup-ready-crops/.

[177] M. Henderson et al., *Glyphosate General Fact Sheet*, OR. STATE U. (2010), http://npic.orst.edu/factsheets/glyphogen.html (Non-selective means that the herbicide will kill all plants that do not have a tolerance to the chemical).

[178] Josep Sanchís et al., *Glyphosate in Groundwater Samples*, SPRINGER-VERLAG (Oct. 25, 2011), https://link.springer.com/article/10.1007%2Fs00216-011-5541-y#citeas.

glyphosate. It also dominates the genetically modified crops market.[179] Monsanto requires farmers who buy their genetically modified seeds to use the company's Roundup brand of glyphosate. [180]

Beyond destroying soil composition and polluting groundwater, glyphosate has also had negative impacts on biodiversity. For example, in 2015, the Center for Food Safety released a study which revealed the severe impacts of herbicide-resistant genetically modified crops on the monarch butterfly population.[181] The report explained that the use of Roundup Ready over the past twenty years has nearly eradicated milkweed, which is the monarch caterpillar's sole source of food.[182] The U.S. Fish and Wildlife Service was considering listing the monarch as a threatened species under the Endangered Species Act because of the sharp decrease in the monarch population.[183]

Many environmental activists that are against Monsanto and the heavy use of pesticides are also opponents of genetically modified organisms because of the close link between the two. Environmental concerns surrounding genetically modified organisms is widespread. In 2015, activists from over 400 cities marched in the third global annual March Against Monsanto (MAM) movement.[184] Many environmental activists wish to avoid genetically modified products by requiring the labeling of genetically modified organisms.[185] In order to promote the consumer's moral and legal right to make an informed decision, the FDA should be designated the responsibility to ensure the clear and transparent labeling of all GM foods. Article IV(1)(a) of the proposed legislation found in section III(A) of this Note addresses environmental concerns by stating that genetically modified organisms cannot have an adverse effect on human health *or the environment*.

E. Religious Concerns and GMOs

Religion is another area where GM food and the consumer's moral and legal right to know come into play. Religious convictions about modified foods and their "unholy state" directly intersects with the science of genetic engineering. [186] Many individuals

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[179] Wilkerson, *supra* note 176.

[180] *Monsanto's Roundup Triggers Over 40 Plant Diseases and Endangers Human and Animals Health*, PERMACULTURE RESEARCH INST. (Jan. 26, 2011), https://permaculturenews.org/2011/01/26/monsantos-roundup-triggers-over-40-plant-diseases-and-endangers-human-and-animal-health/.

[181] Bill Freese & Martha Crouch, *Monarchs in Peril*, CTR. FOR FOOD SAFETY (Feb. 2015), http://www.centerforfoodsafety.org/files/monarch_es_82936.pdf.

[182] *Id*.

[183] Darryl Fears, *The Monarch Massacre: Nearly a Billion Butterflies Have Vanished*, THE WASH. POST (Feb. 9, 2015), https://www.washingtonpost.com/news/energy-environment/wp/2015/02/09/the-monarch-massacre-nearly-a-billion-butterflies-have-vanished/?utm_term=.9125bb59e126.

[184] *World Stands Up Against Monsanto: Over 400 Cities Protest GMOs*, RT NEWS (May 24, 2015, 3:07 PM), https://www.rt.com/news/261573-monsanto-global-protests-gmo/.

[186] Shoot, *supra* note 37.

who speak up about genetically modified organisms reject the argument that religious convictions about genetically modified organisms strengthen the argument for mandatory labeling.[187] In their book, "Acceptable Genes: Religious Traditions and Genetically Modified Foods," authors Conrad Brunk and Harold Coward shed light on the various perspectives that world religions and indigenous traditions have on genetically modified foods [188] Brunk and Coward focus on vegetarianism, Judaism, and indigenous traditions (among other religions) to shed light on the religious concerns that surround the practice of genetic engineering and more specifically, genetically modified organisms.[189]

Religious groups often reject genetic engineering and genetically modified organisms because they generally believe genetic engineering interferes with "God's plan."[190] This belief manifests itself in different ways based on the religion. For example, Judaism uses a set of religious dietary laws, known as Kashrut.[191] Food that is consumed according to Jewish law is termed Kosher, which means that it is fit for consumption.[192] The splicing of animal DNA into a plant has the potential for undermining the Kosher label that is regulated by U.S. law.[193] Although this opinion is not uniform in the Jewish community, the clear and transparent labeling of all genetically modified organisms (up to the 0.9% ceiling) would allow individuals to make an informed decision under their personal interpretation of the Torah.

In an essay on Indigenous traditions and genetic modification, authors Shiri Pasternak, Lorenzo Mazgul, and Nancy Turner explain that maintaining traditional food practices is what keeps people rooted to their past.[194] For example, in Mayan culture, corn is an integral part of the community's spiritual worldview and is believed to be created perfect by God.[195] For many of the indigenous people surveyed in the

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[187] *The Power of Genes,* BBC NEWS *(*Apr. 6, 1999), http://news.bbc.co.uk/2/hi/special_report/1999/02/99/food_under_the_microscope/281365.stm (Concerns about interfering with God's plan are a vague and ill-focused objection. God's plan - if you believe in such a thing - has been interfered with continuously since the beginnings of agriculture and medicine thousands of years ago).

[188] Paul Thompson, *Acceptable Genes: Religious Traditions and Genetically Modified Foods*, 62 (Conrad Brunk & Harold Coward, 2009).

[189] *Id*.

[190] Bruce Armstrong, *Science, Ethical and Biblical Considerations of Genetic Engineering*, CENT. HIGHLANDS CHRISTIAN PUBL'N (2000), http://www.chcpublications.net/genemods.htm.
[191] Tracy Rich, *Kashrut: Jewish Dietary Laws* (Last Visited Oct. 23, 2019), http://www.jewfaq.org/kashrut.htm.

[192] *Id*.

[193] Daniel Nevins, *Halakhic Perspectives on Genetically Modified Organisms* (Nov. 10, 2015), http://www.rabbinicalassembly.org/sites/default/files/public/halakhah/teshuvot/2011-2020/nevins-gmos.pdf.
[194] Shiri Pasternak et al., *Acceptable Genes*, 217 (Conrad Brunk & Harold Coward, 2009).

[195] *Id.* at 247.

essay, genetically modified food was rejected because it did not align with traditional dietary practice and beliefs. [196] Individuals that deal with dietary restrictions, whatever the reason, often need guidance to make informed choices. Labeling only a fraction of foods that contain genetically modified organisms with QR code does not promote the consumer's moral and legal right to know because it keeps many in the dark, doing little to aid informed decision making.

Vegetarianism is another dietary choice, that requires transparent information to allow informed decision making. Individuals adopt vegetarianism for a multitude of reasons, the most prevalent being a moral desire to avoid the consumption of animal products. A large issue that vegetarians have with genetically modified organisms is that gene splicing is not an isolated occurrence. While gene splicing often occurs intra-species (e.g., from one plant to another plant), gene splicing can also occur inter-species (e.g., from an animal to a plant).[197] A focus group from the book collectively agreed that the transfer of genetic material from animals to plans would not only violate the animal's "essence and integrity," but through genetic-modification the plants would also become non-vegetarian. [198]

Although this argument may seem senseless to some, the overarching point is this: clearly labeling all genetically modified organisms would allow individuals to make an informed choice that aligns with their personal views and beliefs. Whether those personal beliefs stem from health concerns, environmental concerns, religious concerns, or ethical concerns is irrelevant. What is relevant is the consumer's moral and legal right to make educated decisions about the products they consume. Article IV(3)(b) of the proposed legislation found in section III(A) of this Note, addresses religious and vegetarian concerns by requiring labeling to note when manufacturers use animal cells in non-animal products.

IV. CONCLUSION

The public's desire for transparency through the labeling of genetically modified organisms is a widespread movement, which encompasses countries from every continent in the world.[199] Sixty-five countries currently require the labeling of genetically modified organisms, including the United States. However, the current legislation has the potential to leave almost one third of Americans in the dark when it comes to GM labeling. The overwhelming support from legislators and the public alike supports the need to amend current legislation to include clear and transparent labels that encompass all GM products. There are many reasons why consumers may want to know that their food contains genetically modified organisms including health concerns, environmental concerns, and religious concerns. Consequently, the FDA, rather than the USDA should be delegated the responsibility to promulgate a new GM

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[196] *Id.* at 262.

[197] *Id.* at 270.

[198] *Id.* at 272.

[199] Ellen Goodman, *GMO Food Labeling on the Ballots and in the Courts*, RIIPL (Oct. 29, 2014), https://riipl.rutgers.edu/gmo-food-labeling-on-the-ballots-and-in-the-courts/ (You shall not sow your vineyard with different sorts of seed, for the yield of the seed which you have sown and the fruit of your vineyard will be unholy).

labeling law that requires clear, transparent labeling for all products containing GMOs in order to support the consumer's moral and legal right to know. Furthermore, to address health concerns associated with pesticide use, the proposed legislation recommends that the EPA should be required to carry out mandatory annual testing for residue levels found on and within GM food products. Accurate testing and clear and transparent labeling will give consumers the opportunity to make informed decisions when it comes to genetically modified organisms.