GM Food Labeling and Rethinking of Geographical Indications (GIs)

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ABSTRACT
GM foods and traditional foods are different types of foods, their characters are different. Countries around the world adopted different labeling systems for GM foods according to national conditions and interests. Thus, defects in applying geographical indications (GIs) to GM foods have shown gradually with expansion of GM foods and their different labeling. Applying GIs to GM foods damages the connection between product and place of origin and the connection between product qualities attribute and place of origin. WTO members have greatly different protection measures for GIs. It is also the direct outcome of differentiated protection.

Keywords: *GM food labelling, Place of origin, Substantial equivalence.*

1. INTRODUCTION

The original application of genetically modified (hereafter GM) technology in agriculture is to improve crop varieties and the ability of crops to resist natural disasters and pests. For example, the first GM tomato with the trade name of FlavrSavr was promoted as a vine-ripened tomato that was less perishable and better tasting than its unmodified run-of-the-mill parental variety. The second product was a genetically engineered soil bacterium commonly called ice-minus bacteria, which was designed to prevent frost damage to crops. [1] (Sheldon Krimsky, 2019) Over the past two decades, the adoption of GM insect-resistant and herbicide-tolerant technologies has reduced herbicide and insecticide use, which decreases the adverse environmental impacts associated with chemical application. [2] (Brookes G, Barfoot P, 2018). But the emergence of GM foods has also brought a lot of problems that humans have never encountered before. The possible risks of GM foods vary in important respects as well. Some GM foods may introduce unexpected allergic reactions in persons who consume them, while others may contradict the ethical or religious beliefs of consumers. Still others may have direct environmental effects as they interact with wild-type species, while some GM crops may encourage or require agricultural practices with different environmental or health risks to producers or consumers. [3]

Considering these advantages and disadvantages of GM foods, the discussion on GMOs has never stopped. The United States originate many kinds crops from GM seeds, while people in European countries hope to separate these GM foods from conventional foods and mark "GM" on their labels. Furthermore, the US and the EU have taken sharply different approaches to the regulation of agricultural biotechnology, adopting not only different regulatory standards but also different regulatory systems for the approval and marketing of GM foods and crops. These different approaches have in turn led to bilateral trade dispute and to a contest in which each of the two parties has sought to export its own approach to the rest of the world. (Mark A Pollack, Gregory C Shaffer, 2009) As a result, different GM foods labeling approach cannot separate GM foods from traditional natural foods in trade. In the current food sales system, this separation is almost impossible. Due to adventitious presence [4] or incompletely separation of GM foods and non-GM foods, most food seller did not know whether their products contained GMO. Thus, GM foods and traditional natural foods share the same GIs. Sharing the same GIs has a big impact. Just imagine: A GM soybean seed originating in the United States can take root and germinate in Heilongjiang Province in

Northeast China. Can it obtain the GIs of Heilongjiang soybean? Under the existing GIs identification, the answer is yes. GM foods and non-GM foods share the same GIs. The most important feature of GI is blurred. The definition and function of GI have been changed while GI cannot express their proper meaning. Moreover, it will not only seriously distorts the requirements of GIs for the qualities and characteristics of commodities, but also damages consumer confidence and affects the fairness of trade.

2. GM FOODS

GM foods are produced from GM seeds or ingredients derived from plants or animals whose DNA has been manipulated using genetic engineering methods. Genetic engineering involves the alteration of an organism's DNA. This is be done either by altering an existing section of DNA or by simply adding a new gene altogether. Supporters of GM foods believe that the definition of a "conventional" crop is ambiguous in light of the ongoing development of scientific techniques of plant breeding over time. They maintain that the health risks from eating organic foods are much greater than for GM ones. In contrast, many critics question the safety of GM foods. They believe that GM foods could encourage perverse selection for antibiotic resistance or trigger allergenic reactions.

2.1 Substantial Equivalence

In 1993, the OECD formulated the concept of substantial equivalence as a guiding tool for the assessment of GM foods. The concept of substantial equivalence is part of a safety evaluation framework, which based on the idea that traditional foods can serve as a basis for comparing the properties of GM foods with the appropriate counterpart. If a new food or food ingredient is substantially equivalent to a traditional food or food ingredient, it can be considered that its safety is the same as the traditional one. [5] Then, at the Joint FAO/WHO Consultation in 1996 (FAO/WHO, 1996) it was recommended that the safety evaluation should be based on the concept of substantial equivalence, which is "a dynamic, analytical exercise in the assessment of the safety of a new food relative to an existing food." The distinction between three levels of substantial equivalence (complete, partial, non-) of the novel food to its counterpart, and the subsequent decisions for further testing based upon substantial equivalence, are similar to those defined by OECD (1996).The Codex Alimentarius Commission of FAO/WHO is committed to the international harmonization of food standards. Food standards developed by Codex Alimentarius should be adopted by the participating national governments. During its first session in Chiba (Japan) in March 2000 definitions were agreed concerning the risk assessment and risk analysis of GM foods. Risk assessment covers issues such as food safety, substantial equivalence and long-term health effects, while risk analysis may include decision-making and post-market monitoring. An Expert Consultation held in Geneva, Switzerland in May/June 2000 evaluated experiences gathered since the 1996 Consultation. Topics considered included substantial equivalence, unintended effects of genetic modification, food safety. Thus, substantial equivalence gradually developed into a management method for product evaluation in countries around the world.

In the U.S., FDA's conclusion about GM foods is that they do not raise special safety concerns as a group as compared to foods created with traditional husbandry practices. Only if particular GM foods present identical risks or differ in taste or nutritional value in a manner consumers might not expect, those risks and changes would be considered "material" and be required to be disclosed in a label. [6] Under the existing framework of the Federal Food, Drug, and Cosmetic Act (FDCA), FDA's implementing regulations, and current practice, including the procedures for labeling, standards for approval of food additives, and GRAS determinations. The FDCA stipulates those new ingredients and additives that are "generally recognized as safe" can be directly marketed without being tested and reviewed by the FDA. It means that if a food manufacturer believes that a new type of food developed by itself is safe, it can be sold directly. Only when they are confused about the safety of new foods, they will consult the FDA before marketing. The FDA will test and analyze the food. If the food manufacturer believes that the food is "generally recognized as safe", actually foods have a safety problem, and it needs to bear legal responsibility. [7] "Generally Recognized as Safe (GRAS)" are exempted from review and directly marketed. The FDA's explanation is that all foods, such as fruits, vegetables and grains, do not have to comply with the pre-market testing because they have a long history as human food. For example, new sweeteners introduced into food through bioengineering will require pre-market testing.

Generally, substances that are added to food will be considered as food additives, including some abnormal chemical effects, unknown toxicity, or substances that will become the new main nutrients of food. According to experience, so far, no such substances have been found. The substances that are intentionally added to food through biotechnology are proteins, fats, carbohydrates and other substances with good properties that have similar functions to proteins. These substances are ubiquitous in people's diets and are safe to consume, so they are generally considered safe. Nevertheless, the FDA still believes that under existing laws, pre-market testing provisions can effectively ensure the safety of foods from new plant species on the market. [8]

The FDA clearly declares that the method of regulating food derived from GM crops is exactly the same as that of regulating food derived from traditional crops. FDA confirm that GM food cannot be less safe than traditional food. If there is no substantial difference between GM foods and traditional foods, it is considered that no special management is required.

2.2 Failure of Substantially Equivalent Food

The principle of substantial equivalence implies the assumption that GM food has no safety hazards. But the OECD has reached the following conclusions: (1) since the concept of substantial equivalence has no clear scope and cannot be predicted, new foods require large-scale animal safety testing. (2) According to the nature of the new food, the effectiveness of the concept of substantial equivalent will determine the range of usefulness that requires extensive safety testing, from useful to negligible. (3) The number and scope of safety tests need to be optimal decisions, not essentially equivalent concepts, but should be determined by the nature of the product. Substantial e qualities means that all the characteristics of the two foods are the same, including those related to consumer safety, nutrition, taste and texture. [9]If no significant difference between GM foods and non-GM foods is found, GM foods are classified as basically equivalent to the corresponding non-GMO foods. There is no further requirement about ingredient detection or labeling as "GM". This is obviously cannot be used as a basis for avoiding extensive testing and labeling of GM foods. The following situations may occur: improper testing, unforeseen side effects, and health risks of derivatives, clinical trials, and label required. [10]

Moreover, some scholar believes that substantial equivalence relies on the premise that the safety of GM food can be assessed through a comparison with compounds or organisms of known safety. The purpose of the test for substantial equivalence is to identify possible hazard areas, which become the focus of further assessment (FSANZ, 2007).The test for substantial equivalence examines the individual characters and not the GM crop as a whole. It does not take into account the alteration of the protein gene sequence prior to insertion or the possibility that the protein gene sequence may have been altered due to the transformation process, although the latter has recently been incorporated into the European Food Safety Agency (EFSA) assessment processes.

On July 29, 2016, the S.764 National Bio-engineered Food Disclosure Standard (hereinafter S.764 Standard) released. The S.764 Standard redefined the term "GM foods" and abandons the pre-marketing voluntary consultation system. It separated "GM foods" from "traditional foods" at a technical level. The attitude towards "GM foods" shifted. Section 293 (3) of the S.764 Standard also made special provisions for "safety": GM foods must successfully complete the pre-market review process under federal government supervision, and cannot be considered "safer" or "not safe" to be compared with other non-GMO foods. [11] From the perspective of legal liability, the FDA's previous regulations did not approve any genetically modified foods to market, nor did any conclusive scientific trials (such as clinical trials) have been conducted. In fact, the principle of "substantial equivalence" has never been clarified in terms of legal liability. It has expressed its commitment, but the signing of the S.764 Standard shows that the United States has formally overturned the principle of "substantial equivalence" in the form of national legislation. The failure of "substantial equivalence" means GM foods and traditional foods are different types of foods, their characters related proteins, fats, carbohydrates and other substances are not the same.

3. GM FOODS LABELING

3.1 GM Foods Labeling Law in the US

According to "Policy Statement on New Plant Varieties" released by FDA, there is “no material difference between genetically modified foods and other food effectively precluded mandatory labeling in the United States. The FDCA granted the FDA authority to require labeling of foods only in limited circumstances. Guidance by industry, the FDA took the position that foods produced through bio-engineering do not have to be labeled as such because the FDA has no basis for concluding that bio-engineered foods differ from other foods in any meaningful or uniform way or that, as a class, foods developed by the new techniques present any different or greater safety concern than foods developed by traditional plant breeding. In June 2013, Connecticut became the first state in the United States to require the labeling of GM foods. The law will require manufacturers and sellers of GM foods to label their products, but due to the "trigger clause", the law has not had an immediate effect.[12] After the legislation of Connecticut and Maine was enacted, Vermont became the first state to initiate the mandatory labeling of genetically modified foods, and the law does not attach any conditions.[13] State legislation has encountered constitutional review of the violation of commercial freedom of speech and latent commercial clauses protected by the First Amendment to the US Constitution.

The US President Barack Obama signed the S.764 National Bioengineered Food Disclosure Standard (hereinafter S.764 Standard) in 2016. Although the official signing of the S.764 Standard did not completely solve all the problems of GM foods, it eased the conflicts and confrontations between state and federal legislation on the labeling of GM foods. The S.764 Standard established mandatory standard for labeling GM foods: any bioengineered food and any food that may be bioengineered is required to disclosure. This standard “prohibit a food derived from an animal to be considered a bioengineered food solely because the animal consumed feed produced from, containing, or consisting of a bioengineered substance; determine the amounts of a bioengineered substance that may be present in food, as appropriate, in order for the food to be a bioengineered food; establish a process for requesting and granting a determination by the Secretary regarding other factors and conditions under which a food is considered a bioengineered food; require that the form of a food disclosure under this section be a text, symbol, or electronic or digital link, but excluding Internet website Uniform Resource Locators not embedded in the link, with the disclosure option to be selected by the food manufacturer; provide alternative reasonable disclosure options for food contained in small or very small packages.....” [14]

Although S.764 has negative aspect in defining GMO, it fundamentally denies the “sound scientific principles” that guide the risk supervision of GM foods, and actually adopts the “precaution principles”, which objectively distinguishes GM foods from traditional foods and acknowledges of the risk of GM food. The S.764 Standard initially separates GM food from non-GMO foods. So far, the GM food labeling system in the US has entered a new era of "mandatory labeling".

3.2 GM Foods Labeling Law in the EU

European Community legislation distinguishes between the nature of the risks that may arise; and, for that reason, provides separately for the contained use of GMOs and for their deliberate release into the environment. [15] For contained use of GMO, Directive 90/219 was originally adopted to control emissions and to prevent accident. After contained use of a GMO for research purpose and before its placing on the market, field trials may be necessary; and the Deliberate Release Directive (2001/18/EC) addresses the deliberate release of GMOs into the environment. [16] Placing on the market constitute the procedural stage that is most tightly controlled, with precautionary measures bolstered and the highest degree of public participation. Directive 2001/18 is largely moulded by a vastly increased consideration for consumer concerns, which required that GMOs placed on the market as or in products must be labelled, but subject to a de minimis threshold in the case of adventitious or technically unavoidable traces of authorized GMOs. [17] The threshold was subsequently fixed at 0.9 per cent, under Regulation 1830/2003.

Regulation 1829/2003 established a unified approval and enforcement system. GM foods that are substantially equivalent" to traditional foods can be marketed without formal approval procedures. Member states of EU can take measures to temporarily restrict or terminate the sales of GM foods, then notify the European Commission. [18] Regulation 1830/2003 established a brand-new

"GM food tracking system" and a stricter labeling system. The tracing system is to record the source and whereabouts of GM foods throughout the production and supply chain. Through long-term monitoring of the circulation of GM foods and the environment of the place of consumption, the potential impact of GM foods on the environment can be assessed. When GM foods are found to have unexpected negative impacts on human health and the environment, the information retained by the manufacturers or distributors facilitate to find GM foods on the market in time and stop their continued circulation. Regulation 1829/2003 and Regulation 1830/2003 have stricter requirements on the labeling of GM foods, as long as foods contain or are made of GMOs, special labels are required for identification. [19]

3.3 GMO Labeling Standard in CAC

The Codex Alimentarius Commission (hereinafter CAC) establishes principles and guidelines for food safety assessment of GM foods in the document "Food derived from modern biotechnology." This document is not intended to suggest or imply that foods derived from modern biotechnology are necessarily different from other foods simply due to their method of production. Moreover, CAC recommends applying the same rules concerning food labeling regarding the allergenic potential to both biotechnology-derived and products not obtained by modern biotechnology. Finally, the "Review Processes" suggests that analysis and risk management should be "evaluated and reviewed as appropriate in the light of newly generated scientific data". [20]

The feature of CAC document is that it is not a special provision for GM foods, but puts forward and sorted out the provisions on GM foods in existing legal documents, and finally formed a general mandatory and voluntary labeling. The text does not use special methods to solve the problem of GM foods labeling, but only provides recommendations for the domestic laws and regulations of various countries through existing legal documents. The text is divided into two parts. The mandatory labeling clause and the voluntary labeling clause should be subject to the existing document clauses of the Codex Alimentarius Commission. [21]

Among the more important documents are the principles of risk analysis for foods derived from modern biotechnology (CAC/GL 44-2003), and guidelines for food safety assessments derived from recombinant DNA plants (CAC/GL 45-2003). Guidelines for Food Safety Assessment of Recombinant DNA Microorganisms (CAC/GL 46-2003), Guidelines for Food Safety Assessment of Recombinant DNA Animals (CAC/GL 68-2008).

CAC cannot solve the problem of GM foods labeling in international trade. The reason is that the scientific theory is uncertain. Most of the CAC standards are based on science, and the rules lacking scientific basis. These standards are easily questioned by the state and may be abused. The allergenicity of GM foods has been proved by scientific evidence, and a consensus has been reached among countries to form a Codex standard. The labeling of GM foods in all draft texts is recognized. However, there is still a lack of scientific support for other potential risks of GM foods. Countries adopt different labeling systems for GM foods according to national conditions and interests. Under the WTO framework, the labeling of GM foods in some countries is recognized by other member states as non-tariff barriers, hindering the import of GM foods and triggering trade disputes.

4. GIs

GIs are place names used to identify commercial products that come from places and to protect the qualities and reputation of a distinctive product originating in a certain region.[22] GIs also serve as a marketing tool that can add economic value to agricultural products by conveying a cultural identity using the region of origin, acknowledging the value of specific human skills and natural resources in the production process, and creating a unique identity for the products.[23]

4.1 Definition

4.1.1 Definition of GIs Under the WIPO

The Paris Convention was the first international treaty to distinguish an "indication of source" from the broader classification of trademarks. Then, the Madrid Agreement for the Repression of False or Deceptive Indications of Source on Goods goes further than the Paris Convention, requiring Member States to prevent not only the use of false indications but also the use of indications of source that are deceptive. The Lisbon Agreement used the term of "Appellation of Origin" that not only to identify the source, but also to associate the goods as having certain qualities or characteristics. The

Agreement went beyond the two earlier Agreements in that it created an international Register for Appellations of Origin administered by the WIPO. [24] WIPO believed that "GIs embraces the terms indication of source and appellation of origin." In WIPO's terminology, it is used in the broadest sense and is not limited to indications used for products the qualities of which are influenced by their geographical origin. [25] A GIs (GI) is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. In order to function as a GI, a sign must identify a product as originating in a given place. In addition, the qualities, characteristics or reputation of the product should be essentially due to the place of origin. Since the qualities depend on the geographical place of production, there is a clear linkage between the product and its original place of production. [26] Essentially, by attaching a GI to a good, there is a reputation associated with a particular geographic region, and this indication prevents unauthorized users with a substandard product from passing off that product under the premise that it shares that region's reputation of qualities. [27]

4.1.2 Definition of GIs Under the TRIPS

GIs protection was subject matter in the 1883 Paris Convention for the Protection of Industrial Property, the 1891 Madrid Agreement for the Repression of False or Deceptive Indications and the 1958 Lisbon Agreement on Appellations of Origin.[28] Then broader protection are adopted within the World Trade Organization (WTO). The specific regulation concerning GIs are addressed in the Agreement on Trade-related Aspects of Intellectual property rights (TRIPS Agreement).

The paragraph 3 Article 22 of the TRIPS Agreement requires that A Member shall, ex officio if its legislation so permits or at the request of an interested party, refuse or invalidate the registration of a trade mark which contains or consists of a GIs with respect to goods not originating in the territory indicated, if use of the indication in the trademark for such goods in that Member is of such a nature as to mislead the public as to the true place of origin. This paragraph indicates that the biggest difference between GIs with other terms is that GIs belong serve the same function of trademarks. The paragraph 4 Article 22 of the TRIPS Agreement indicates that the protection under paragraphs 1, 2 and 3 shall be applicable against a GIs which, although literally true as to the territory, region or locality in which the goods originate, falsely represents to the public that the goods originate in another territory. GIs are used by a country to regulate products within its territory. GIs are applicable to commodities.

4.2 Constitute Elements

GIs" has specific constitute elements, which determine the attribute and application scope of GIs, as well as its protection range. According to the definition given by TRIPS, " GIs is the product marking indicating the source of product within the territory of contracting state or certain place or district in above territory. Product qualities, reputation or other property depend on the place of origin in nature". [29] Therefore, the definition of GIs includes three concepts and two kinds of connection. The three concept are product, place of origin (i.e. the carrier of GIs, either as state, district or place), and product qualities attribute (i.e. Qualities, reputation and property). While two kinds of connection include the connection between product manufacture and place of origin, and the connection between product qualities attribute and place of origin. [30]

It can be seen that the carrier of GIs can be countries, regions and locations. In general, GIs put more emphasis on the linkage between the product and the place of origin, which goes beyond the qualities or characteristics of the product indicated by the name of origin depending on the place of origin, and increases the goodwill of the product. Compared with the indications of source of goods proposed in the "Paris Convention", GIs are subordinate to indications of source of goods, and the scope of application is limited to the territory of a country. It emphasizes the connection between the goods and the place of origin, which is not only the "birth place" of the goods. It also includes "intangible assets" such as the reputation of the "birthplace" itself. It can be said that GIs are closely related to commodities, and even for consumers, GIs of commodities can stimulate purchase behavior more than trademarks. The source mark emphasizes the source of the goods, which can be very extensive.

5. GM FOOD AND GIs

5.1 Defects in Applying GIs to GM Foods

5.1.1 To Damage the Connection Between Product and Place of Origin

Different from other international trade products, the prime risk of GM crop is that it may pollute the seed and fruit of non-GM agricultural products via cross pollination and accordingly reach involuntary gene transfer potentials. The term of "accidental mixture" means "the unintentional and accidental entry of molecule mixture to a type of seed, grain or agricultural variety". Although the "accidental mixture" potential of GM substances in agricultural products is not particular, the mixture of non-GM seed and fruit and GM crop is very intractable. The reason is that GM substances would enter foreign agricultural products and feeding and cannot be completely discovered, discussed or regulated by state internal administration procedures. The "accidental mixture" problem is not particular to GM crops. Most agricultural products have unwilling "accidental mixture" problems to some degree (including plant, wild grass, dirt, stone and undesired seed) and set up the tolerance threshold for "accidental mixture". It gives rise to consequences in two dimensions. First of all, the danger of more and more GM crops could be hardly controlled. For instance, illegally planted GM crops may become the culprit of pollution of agricultural products, feeding or medicine. Secondly, supposing the dangers of GM crops could be controlled, even agricultural products contain micro-GM ingredients, most consumers still do not want to see such ingredients in their food. Beyond this, the foremost influence produced by "accidental mixture" is that once it happens, agricultural products produced by cross-border countries with polluted agricultural crop raw materials would contain GM ingredients more or less. Furthermore, two conditions might arise from it. Firstly, the cross-border countries determine the GM ingredients in agricultural products with strict supervision system after scientific analysis and recognition. Secondly, the cross-border countries lack corresponding supervision system and fail to discern the GM ingredients in agricultural products. However, no matter what condition occurs, once agricultural products are mixed with GM ingredients, the guarantee of place of origin for product property will lose its meaning. The connection between product and place of origin will be interrupted by the interference of GM ingredients.

5.1.2 To Damage the Connection Between Product Qualities Attribute and Place of Origin

5.1.2.1 Change of Product Qualities Attribute

The feature of GM technology is that it suppresses non-ideal property by promoting ideal property and allows genetic modification to be more accurate, effective and fast. GM technology could not only create highly similar varieties by genetic modification. Moreover, a series of chemical methods could also change the accuracy according to designed path while modifying the genes of organism. This means that GM agricultural products basically change original property after being added with new gene segments during genetic modification process for traditional agricultural products. For instance, irrespective of the property difference between GM wine and traditional wine, they easily share GIs by sharing the place of origin. The meaning of "GIs" is actually to protect product property in the place of origin. In other words, the most distinct difference between products protected by GIs and other products consists in property. If GM agricultural products and non-GM agricultural products share GIs, the most important legal feature of GIs will be obscured.

5.1.2.2 Difference in Product Qualities

Those agricultural products which have been modified genetically by virtue of GM technology possess the traits desired by people through changing the original property of plants. This is also the purpose of GM technology. Consequently, there inevitably exists difference between GM plants and traditional plants in property. For instance, irrespective of the property difference between GM wine and traditional wine, they inevitably possess different qualities. Likewise, GM soybean oil and non-GM soybean oil have different manufacturing crafts, in which the former is prepared with chemical immersion method, and the latter is prepared with physical squeezing method. Regardless of the change of property in GM soybean after being modified genetically, different manufacturing crafts still cause the qualities difference between GM soybean oil and non-GM soybean oil. In this sense, qualities of GM agricultural products broke the connection between agricultural product place of origin and qualities, and affects the meaning expression of GIs.

5.1.2.3 Difference in Product Reputation

In late 1990s, 65% consumers in Sweden, 69% consumers in Austria, 50% consumers in Germany, 39% consumers in Britain, and merely 14% consumers in America thought that GM products contained sever risks. Until 2010, European consumers still felt hard to accept GM products. For instance, most Ireland consumers disapproved GM products. With the elapse of time, consumers have increasingly higher cognition about GM technology and product, but increasingly lower acceptance level. The risk cognition and acceptance level of GM food directly affect the reputation of product. Consumers' willingness to buy is the direct reflection of product reputation. Obviously, the fairly distinct difference between GM product and non-GM product in reputation in reality interrupts the connection between product reputation and place of origin.

The reason why the connection between product and place of origin is thought to be interrupted is that there exist great differences between GM agricultural products and non-GM agricultural products in terms of property, qualities and reputation. The property of GM agricultural products exactly interrupts the connection among "property, reputation, qualities and place of origin" in the GIs legal structure defined by TRIPS. As stipulated by Article 11 of TRIPS, if the indication or description of certain goods uses any means to clarify or suggest that involved goods originates from some geographical area except real place of origin, the geographical source of the goods may mislead the public. Thus, the importance of GIs to product place of origin could be clearly seen.

5.2 Inherent Defect of TRIPS Protection Framework

WTO members' legislation of GIs ought to comply with the minimum protection standards stipulated by TRIPS. TRIPS Protocol sets up differentiated protection for GIs. Article 22 provides relative and subjective protection for overall GIs. Such kind of protection takes public misunderstanding or confusion as the premise and subjective relevance as the foundation. Article 23 provides objective and absolute protection for wine GIs. Such protection merely takes local customs and practices and other objective relevance as the judgment foundation, excluding public cognition. Besides, Article 24, the exception clause of TRIPS, greatly restricts the absolute protective force of GIs. Article 24 exception clause could be viewed as the compromise with America which aims to prevent American legal and commercial operation from negative influences. Differentiated protection eventually offered by TRIPS is the gaming product of America and Europe in the field of intellectual property. Objective protection advocated by Europeans in wine product wins victory, while subjective protection and exception clause applicable for other products protect the rights of America. Differentiated protection is the outcome the mutual compromise between American and European interest groups. Lack of legal evidence, it also violates the principle of e qualities. Therefore, since the inception of TRIPS, WTO member states have greatly different protection measures for GIs. It is also the direct outcome of differentiated protection.

From another perspective, TRIPS framework creates a large flexible space for the protection of GIs. As TRIPS Protocol does not elaborately regulate the certification of connection between product and place of origin nor classify the place of origin of GIs, member states enjoy great discretion power over the legislation of GIs. Such condition does not produce significant impacts on the protection of intellectual property, because the international protection for intellectual property is guaranteed by numerous international treaties such as *Berne Convention*, and *Paris Convention*. Whereas, international conventions are failed to regulate GM agricultural products. Available *Cartagena Protocol on Biosafety* merely regulates the cross-border transfer of GM organism at the technical layer, but ignores the international trade control of GM agricultural products. Nevertheless, GIs certification under the framework of TRIPS has been affected, impacted and changed with the rise and development of GM agricultural products. Limited by feature and field, existing protection framework could not solve the realistic problems caused by new technology and product.

5.3 Difference Between GM Agricultural Product Trade Supervision in Countries

According to present agricultural product market conditions, there exists great difference in GM agricultural product supervision among countries in the world. Taking GM food labeling policy for example, different countries have implemented varying supervision and control regulations as to the labeling content, threshold

value and tracing of GM agricultural products. EU1830/2003 Rules regulate that the labeling scope of GM agricultural products includes all agricultural products or feeding derived from GM organism, no matter whether the final product contains any new gene or protein. Additionally, as to labeling threshold value, it regulates that agricultural products must be labeled once GM ingredients exceed 0.9%. [31] Russia has consistent threshold with EU, declaring that agricultural products must be labeled once GM ingredients exceed 0.9%. The scope of labeling for GM agricultural products in Australia includes agricultural products with altered nutrition value or agricultural product property or over 0.1% GM ingredients (i.e. 0.1% labeling threshold). The coercive labeling scope for GM agricultural products in S.764 National Bio-engineered Food Disclosure Standard in America merely includes agricultural products modified by DNA recombination in vitro. Besides, it does not enact any specific rules for labeling threshold value and form. The labeling scope for GM agricultural products in South Korea includes soybean, bean sprout, maize and potato, and corresponding labeling threshold is 3% GM ingredients. GM agricultural products may be labeled as "GM product", "product containing GM ingredients", and "product possibly containing GM ingredients". In Japan, processed agricultural products (24 agricultural products made of soybean or maize) which take agricultural products as the prime raw material and preserve residuals of recombination DNA or coding protein should be labeled with the labeling threshold value as 5%.

Difference in the supervision of GM agricultural products further aggravates the impacts of GM agricultural products on GIs. Due to the difference among existing GM agricultural product labeling systems, GM and non-GM agricultural products could not be totally separated. Unquestionably, such result amplifies the impacts of GM agricultural products on the meaning expression of GIs, deprives consumers' right to know when they purchase agricultural products and leaves impacts on the equity in free trade and market.

6. RETHINKING OF GIs

6.1 Restriction of GIs

Just imagine if a GM soybean seed in America takes root and sprouts in Heilongjiang Province in Northeast China, could it obtain the GIs of Heilongjiang soybean? The answer is no under available GIs certification framework. Growing such GM soybean should be certified as the means that suggests the product is produced in some geographical district except the place of origin. Moreover, non-GM soybean oil produced by physical squeezing in Heilongjiang Province may share the same GIs with GM soybean oil produced by chemical immersion imported from America. Such phenomenon profanes GIs, since the sharing of the same GIs between GM and non-GM agricultural products severely distorts GIs's requirements on product qualities and property. Additionally, such condition even impairs consumers' confidence, and further affects trade e qualities.

Considering such circumstance, GIs certification rules must be strictly prescribed to adapt to the needs of GM agricultural products in the market. In another word, before the proposal of any proper solution, GIs certification should exclude GM agricultural products at present. For instance, at the beginning of legislation for *Organic Food Production Act*, the Ministry of Agriculture in America prepares to label GM food as "organic food", but this decision is strongly protested by consumers. The Ministry of Agriculture eventually accepts consumers' pursuits for the "naturalness" of organic food, and satisfies their expectations by excluding GM food from organic food certification. Therefore, the due meaning of GIs could only fully and completely expressed by strictly prescribing GIs and excluding GM agricultural products from GIs. Only when GIs has its due meaning, Chinese consumers would ascertain what they want to buy is the qualities French wine naturally cultivated under special geographical environment, and American consumers would feel assured to buy their desired local special products from China such as Jinhua ham, Yongchun citrus and Wuchang rice. Besides, some scholars consider that the potential risks of GM agricultural products would pass to consumers via "non-GM indication". But the fact is that only when GM agricultural product indication is adopted, consumers could independently choose GM or non-GM products and it is no need to label any special indication for non-GM agricultural products. This move well ensures the right to know of consumers.

6.2 Supplementary Rules for GIs Certification in TRIPS

Under existing legal structure of GIs, product property, qualities, and reputation is closely related to place of origin, GM agricultural products and non-GM agricultural products share GIs, and GIs legal structure suffers from great shocks from GM agricultural product trade.

As for the GIs shown on product package as a label, it is usually composed of place of origin and product name. Therefore, from the perspective of consumers, they directly take GIs as the combination of place of origin and product name. Although product qualities attribute is not directly reflected from product package, it is still the foremost part in GIs legal structure. Product qualities attribute is the most critical factor in GIs legal structure. Exactly due to the specificity of qualities, GIs product is greatly different from other products. According to such features, people are able to distinguish GIs products from other products. Special reputation requests people to have a general understanding about products with GIs. GIs defined by TRIPS stresses the connection between product and place of origin. Such kind of connection has already surpassed the threshold where product qualities or property is up to place of origin and accordingly boosts product reputation. As a sort of market instrument, GIs is able to convey cultural identity via the place of origin, add agricultural products' economic values, acknowledge the value of specific human skills and natural resources in the production process and create special identity for products. However, what GM technology changes is exactly the property of agricultural crops. The change of GM agricultural product property interrupts the unique attribute endowed by product "place of birth", weakens the connection between product and place of origin and affects the qualities, reputation and other "intangible assets" endowed by product "place of birth".

In view of the property of GM agricultural products and the complexity of agricultural product control, the stability of GIs legal structure must be maintained by further explaining TRIPS' GIs certification and formulating specific supplementary rules for GM agricultural products. The feasibility of the implementation of supplementary rules should be attributable to the fact that as WTO under TRIPS framework provides minimal protection, it allows for the free legislation of member states and leaves certain space for the improvement of available rules.

6.2.1 Compound Labeling

The inherent structure of TRIPS, GIs is hardly to be supplemented and improved. Therefore, the more feasible practice now is to combine GM labeling with GIs. Such practice has realistic operability in that following the issuance of National Bioengineered Food Disclosure Standard (US) and most countries including China have successively implemented coercive labeling system for GM food and GM agricultural products. On account of coercive labeling system, GIs supplemented with GM food labeling helps maintain the connection between product qualities attribute and place of origin, and guarantees the right to know of consumers. However, such practice could not totally compensate the damaged legal structure radically.

6.2.2 Threshold

Another feasible solution to solve the difference in GM labeling system is to set threshold value for GIs. By setting the threshold value for GM ingredients in products with GIs, product property could be protected from being affected by GM ingredients to the fullest, which in turn ensures the stability of product and product qualities attribute and contributes to maintaining the connection between "product and place of origin" and "product qualities attribute and place of origin" in GIs legal structure. Whereas, the key to such solution lies in the setting of threshold value, such as how much proportion of GM ingredients in agricultural products may affect the agricultural product qualities attribute. In respect of technology, there is no great difference between the threshold value set by GIs and the threshold value set for GM food. However, in consideration of the reputation requirements of GIs product, threshold value setting should be carefully examined. In respect of value, setting threshold value for GIs is not simply to protect the concept and validity of GIs, but more importantly to safeguard the rights of consumers and pursue justice and fairness. As a result of the difference in available GM food labeling systems and the weak coordination ability of international law, realistic problems in present stage could be merely solved by setting rational threshold value for GIs.

7. CONCLUSION

Both TRIPS and GIs regulation in domestic law affirm the connection between product qualities attribute and territory in GIs certification. Since the trade development of GM foods affect the concept of GIs, GM foods should be excluded from the scope of GIs. Hence, it is urgent to restatement the concept of GIs both in domestic law and international law. With the continuous development and progress of GM technology, the variety and scope of GM foods have been continually expanded. Restricting GIs scope and excluding GM agricultural products from certification could simply protect the purity of “GIs” for a moment. Once GM crops have been cultivated in a large scale, it is hard to restrict the “pollen flow” of GM crops. Till then, seed producers even need to develop large-scale seed tracing and identification procedures. In consequence, the meaning of GIs is to classify GM and non-GM products in specific territory, and meanwhile impose prohibitive restriction on the cultivation of GM crops. GM crops should be cultivated with security and cross-border management and controlled by strict and sound tracing and identification mechanism within exclusive territory.

AUTHORS’ CONTRIBUTIONS

This paper is independently completed by Ting Liu.

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