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Study on International Genetically Modified Food Labeling System via the Perspective of Consumers' Right to know

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Abstract. China has been promoting the industrialization of genetically modified technology and has implemented stringent labeling regulations to safeguard consumers' access to information. The labeling system plays a crucial role in linking technology commercialization with market consumption. Yet, in practical applications, the labeling regulations has deepened consumer prejudice and impeded the progress of the genetically modified food business. The genetically modified food labeling systems of the United States, the European Union, and Japan merely cover most of the labeling types worldwide. Either adhering to scientific reliability principle and adopting a voluntary labeling system, or adhering to risk prevention principle and adopting a mandatory labeling system, or implementing the principle of combining rigidity and flexibility and adopting a compromise management, different countries have established genetically modified food labeling systems based on their own circumstances. Learning from global advanced practices and tailoring them to the characteristics of China, we have the potential to boost our own genetically modified labeling system progressing.

Keywords: Genetically Modified Food; Labeling System; Consumer's Right to Know; International Experience; China's Characteristics.

1. Introduction

China is now confronting food security concerns, such as a decline in per capita arable land area and a drop in rural labor force. Applying genetically modified technology is an effective strategy to address these problems and accelerate agricultural development.

The adoption of genetically modified technology requires a smooth transition between the supply side and the demand side. Although China's continued developing genetically modified technology and expanding relevant markets, the majority of Chinese consumers are reluctant to buy edited food. Previous international experiences have demonstrated that the stricter a country's genetically modified food labeling system is, the more likely it is to frighten customers when picking relevant food, leading to a unwelcome market.[1]

Different countries utilize various labeling methods for genetically modified food, leading to diverse market and industrial performances. Given its lenient voluntary labeling criteria, the US produces and consumes the most genetically modified food in the world, with a 75%–80% market share of processed foods. The domestic genetically modified food business is uncompetitive as a result of EU threshold limits and traceability controls. However, the EU's imports of genetically modified soybeans account for about 90% of the total imports. Japan, in spite of introducing a compulsory labeling system, has granted exemptions for genetically modified labeling, which has helped maintain a steady local consumer market.

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2. The Current Status of Global GMF Labeling System

2.1. The United States: Voluntary Labeling System under Reliable Science Principle

2.1.1. The Labeling System for GMF in the United States

The United States has always adhered to the reliable science principle for genetically modified food, which is assumed to be safe if there is no scientific evidence to prove that poses significant differences or safety issues from non-genetically modified food.

On this basis, the United States adopts a voluntary labeling system for genetically modified food, so manufacturers are not required to label food packaging with GMF marks. If a producer actively labels product, it has to ensure the legitimacy of the information and avoid misleading or confusing customers.

2.1.2. The Evolution of the Labeling System for GMF in the United States

In the US, genetically modified food labeling legislation has gone through two stages: voluntary labeling stage and obligatory labeling stage.

In 1996, during the so-called "voluntary labeling" stage, Food and Drug Administration of US outlined the concept of "substantial equivalence" and suggested that existing safety regulations for traditional food could be applied to manage genetically modified food. [2] It was emphasized that unless new features affecting food safety, no specific labeling is required for genetically modified food.

President Obama of US announced “the National Bioengineering Food Disclosure Standard”, effective from January 1, 2020, imposing obligatory labeling of genetically modified food across the federal. [3] The agreement defined biotechnology as genetically modified food, but did not include genetically edited manufactured products. The regulation also set a threshold for genetically modified substances. Processed food is exempt from labeling if the related components detection value is below 5%. What’s more, in addition to using misleading reverse labeling, manufacturers have the option to choose their own labeling techniques for text, symbols, or patterns. [4]

2.1.3. Inspiration from the Labeling System of GMF in the United States

The US government upheld the stance of innocence presumption. The Federal Food and Drug Administration, in charge of regulating food labeling, adheres to the "substantive equivalence" perspective, stating that genetically modified food have no substantial difference in composition or safety from traditional food. Many reputable scientific organizations have proven the safety of genetically modified food. With strong government backing, American producers have been inspired to expand their research, development, production, and sales of genetically modified food. This has indirectly alleviated consumer worries regarding the potential hazards as well.

The lenient labeling system has facilitated the commercial use of genetically modified technology in the United States. Genetically modified food, which is unrecognizable from conventional food products, has quickly swept the market and embraced by customers. The United States now ranks first in both the production and consumption of genetically modified food .

Although genetically modified food hold a significant portion of the US’s market, it restrict consumers’ purchasing options to some degree. Except for food that is only sold at organic grocery shops, most of the food sold in American markets has received its genes edited. Genetically modified components may be found in almost all soybean, corn oil and starch products. [5] Although majority of Americans accept genetically modified food, clear labeling allows purchasers to choose food they prefer.

Despite the fact that the most recent law stresses the necessity for labels, American customers still have trouble shopping. The so-called "compulsory labeling" is about supervising relevant producers and sellers. It doesn't give buyers of genetically modified food better reference information to

preserve their right to know For example, The US Genetically Modified Food Right to Information Act stipulates that food containing or processed from genetically modified ingredients must be labeled. However, in practice, producers only set up particular labeling for genetically modified components if the food have adverse impacts. The compulsory attachment of labels with restricted scope, merely imposes an administrative burden on producers, offering little safeguard for consumers' autonomy to make informed decisions.

2.2. EU: Mandatory Labeling System under the Principle of Risk Prevention

2.2.1. The Labeling System for GMF in the EU

The European Union has always exhibited prudence when it comes to genetically modified food, enforcing stringent guidelines for the oversight of food safety and the labeling of genetically modified food. Based on the preventative approach, the EU has established a process-centered "mandatory labeling" system for genetically modified food, including mandatory labeling requirements and traceability restrictions.

Mandatory labeling requires manufacturers to accurately identify genetically modified food, feed, and food additives, including component quantities, types, allergenicity and nutritional differences from similar general foods. The severe criteria stipulates that any relevant component over 0.9% of the total product weight must be labeled with the slogan "the product contains genetically modified organism". [6]

The traceability regulation mandates that all genetically modified food authorized for sale must be granted a unique identifier that tracks the product throughout the whole food distribution network. Producers are responsible for documenting the complete business chain by this code. Participants in each step are expected to report genetically modified food information in a standardized way publicly after the transaction, maintaining it for 5 years. [7] Any stage in the manufacturing process that contains genetically modified components requires an identity record, even if the completed product does not contain such chemicals.

2.2.2. Inspiration from the Labeling System of GMF in the EU

The EU has demonstrated the safety of genetically modified food under its authority to consumers through practical steps, including national linkage and complete process tracking. The rationale of presuming responsibility can help minimize risks associated with genetically modified food without causing irreversible consequences.

The EU mandatory labeling strategy fully safeguards consumers' right to know, allowing them to have a clear understanding of genetically modified food at a glance. By using their comprehension of genetically modified food, individuals can make suitable food choices, hence enhancing consumers trust in buying genetically modified products. Full traceability can guarantee producers and sellers to be responsible for the safety of genetically modified food they develop and sell, promoting the safe progress of genetically modified technology for the sake of humanity.

In recent years, owing to frequent climatic catastrophes such as droughts and floods, many EU officials change their initial stance and seek to protect the food supply on the huge European continent via using genetically modified technology.

The consumer-oriented genetically modified labeling system in the EU has somewhat hindered the advancement of genetically modified food production and restricted the widespread use of technology.

2.3. Japan: Compromise System under the Principle of Balancing Strength and Flexibility

2.3.1. The Labeling System for GMF in Japan

Japan takes a balanced approach to labeling genetically modified food, ending up with a compromise labeling system that combines the elements of the US's emphasis on scientific reliability and the EU's focus on risk prevention.

The labeling management of genetically modified food in Japan is similar to that of the European Union with mandatory feature. A catalog is developed to specify that only 8 selected genetically modified crops and 33 goods derived from them need to be labeled. [8] Genetically modified food lacking differentiated production and distribution processes are obligated to show a "genetically modified instruction" label and a certificate issued by third-party organizations. Japan also adopts a dynamic adjustment mechanism, which requires yearly approval of genetically modified crops and processed foods included in the catalogue. [9]

However, unlike the EU, Japan's labeling system for genetically modified food has voluntary characteristic. Labeling is product-specific, thus producers are not required to declare “genetically modified food” if the final product entering the market lacks related components. Even if the genetically modified food contains ingredients in the list, as long as the component is not used as the main raw material and is below the specified threshold of 5%, the specific food can be exempted from labeling. [10]

2.3.2. Inspiration from Japan's GMF Labeling System

Regardless of Japan's eagerness to increase its food production with the use of genetically modified technology, its posture on genetically modified food is neither as tolerant as the United States, nor as stringent as that of the European Union. [11] Japan's compromise system includes mandatory labeling requirements while allowing for potential enhancements, effectively balancing the conflict between protecting consumers' right to know, producers' economic interests, and regulatory enforcement by authorities.

The compromise labeling system of Japan is conducive to promoting the commercial application of genetically modified technology. Meanwhile, consumers are more open to alternatives due to the high substitutability of non-genetically modified food.

3. Experience of International GMF Labeling System

3.1. Summary of International GMF Labeling System Experience

The GMF labeling system of the United States, EU, and Japan combine most common labeling types worldwide, representing a degree of advancement. By understanding the background, mechanism, and content of these systems, following experiences can be concluded:

Firstly, the response to genetically modified food labeling laws should be based on necessity rather than public desire. The right to know allows individuals to have greater flexibility in decision-making after being informed, whereas genetically modified technology aims to address food shortages in a country. If obligated labeling of genetically modified food is completely decided by customer demand, then the information on the labels would be boundless. [12] Protecting consumers' right to know is not an excuse to harm the interests of businesses. Japanese customers hold cautious attitudes while buying genetically modified products. Given Japan's great dependence on food imports, there is an urgent need for the use of genetically modified technology to tackle the country's domestic food issue. The solutions for threshold recognition and exemption management comply to the principles of required and flexible labeling. This ensures the progressive progress of genetically modified food production while giving consumers sufficient space to make choices.

Secondly, the labeling system for genetically modified food should prioritize consumers' access to knowledge above the safety of genetically modified food throughout implementation. The labeling of genetically modified food is not for safety reasons, but for consumers have the right to know what is in such products, where their components come from. This could be compared to the usage of organic food labeling. Safety is not the reason for labeling, and labeling is not a guarantee of safety. The labeling system is neither a warning system, nor a punishment for the so-called original sin of genetically modified food. The latest revision of the US labeling system clarifies that compulsory

labeling does not change the stance that genetically modified food is substantially equivalent to non-genetically modified food.

Finally, merely relying on mandatory labeling is insufficient to uphold consumers' right to information on genetically modified products. Consumer involvement and market disclosure are other effective approaches to safeguard consumers' right to be informed more about genetically modified food, though obligatory labeling remaining the most expensive one. [13] This legislation calls for the separation of genetically and non-genetically modified raw materials at each process step, from farm to table. And it also requires the use of distinct tools for manufacturing, storing, shipping, and evaluation prior to sale. [14] While emphasizing consumer rights and ignoring the economic benefits associated with wide scale application, the EU's mandatory labeling system increases production and sales expenses at the forefront of the genetically modified food industrial chain. Compulsory labeling is never as easy as putting huge script on product packaging.

3.2. The Shortcomings of China's GMF Labeling System

China has numerous genetically modified food labeling laws, however they are dispersed among agricultural genetically modified food law or food safety laws. The absence of a structured and scientific regulatory system might lead to practical implementation challenges. In essence, China's genetically modified food labeling system lacks explicit statutory positions.

To begin with, China's labeling system lacks legislative ideas and has not followed the trend of boosting the genetically modified business. The system contains distinctive global management requirements where any product containing genetically modified elements mentioned in the catalogue must have appropriate labeling. The EU's genetically modified food labeling system, recognized for its stringent requirements, nonetheless allows for a threshold of 0.9%. Regulation in China has gone beyond the appropriate boundaries of obligatory labeling, potentially resulting in chaotic and inaccurate labeling in the consumer market.[14]

Furthermore, the Chinese labeling system fails to demonstrate sincere consideration for public, disregards the their expectations about governmental regulation of the genetically modified food industry. Requesting merchants to prominently label their products has mistakenly treat identification means as the purpose. This behavior value the form rather than the meaning of identification.[14] The labeling system for genetically modified food should not only ensure customers are informed, but also help educate public about relevant knowledge, enhance their comprehension, and reduce resistance to consuming such food. At present, the majority of people has prejudice against genetically modified food and refuse to consume them.

4. Recommendations for Enhancing China’s Labeling System of GMF

In contrary to Europe, which uses its huge plains as granaries, and Japan, which has a solid economic foundation for agricultural food imports, China faces serious issues with food safety. Consequently, exhaustively studying the labeling systems implemented in Europe and Japan about genetically modified food would not be a prudent course of action. As one of the few nations with a complete industrial chain of researching, testing, manufacturing, processing, operating, and importing genetically modified food, China should investigate the US's application path and labeling system.

Firstly, clarify the position of China's genetically modified food labeling system, and consider boosting the industrialization of genetically modified food as the legislative purpose of labeling.

Only legal rules, scientific and technological testing, and authoritative agency credibility guarantees can ensure the basic safety of genetically modified food and create a fair market for it to compete with general food. The labeling system seems to defend customers' right to know during the promotion of genetically modified food, but in reality, it serves as a test of legal authority and government legitimacy.

While consumers have the right to know about food information, genetically modified food labeling should be limited to need. Focusing too much on customer concerns does not work to change most Chinese views about genetically modified food and also hampers the adoption of technology. Legislation on genetically modified labeling should direct customers attention on flavor, nutrition, and pricing details, rather than food safety. All in all, the advancement of the genetically modified business relies on both technological innovations and customer demand.

Second, establish threshold labeling to comply with international standards and clarify the relationship between the safety issues of genetically modified food and its labeling.

Currently, China adopts the directory management of genetically modified food labeling, which implies that any item containing genetically modified substances mentioned in the directory must be labeled accordingly. This confuses labeling as a guarantee of safety and attempts to control the hazards of genetically modified products through a list. Appearing rigorous and explicit, but the list actually detached from reality, because it is difficult to completely monitor genetically modified substances in food in real manufacturing. Since illegal behaviors are unpredictable, the rules may lead to the uncertainty of law enforcement and supervision.

We can learn from international threshold regulations and imitate to establish a threshold for genetically modified food with Chinese characteristics. As an obligatory labeling regulation, the threshold tolerates minor modified elements in food, showing official's commitment to consumers. What's more, it can facilitates law enforcement and the international commerce of relevant products.

Finally, design the label flexibly to balance consumers' right to know and genetically modified food development.

Excessively strict labeling laws will cause producer dissatisfaction with greater expenses and seek ways to skirt standard labeling, but rough instructions could make customers anxious about vague information and refuse to consume goods. The interests of both customers and makers need to be brought together as much as possible. To help manufacturers fulfill the disclosure standards without negatively affecting consumer impressions, QR codes or other forms of identification are flexible options to choose. Besides, it can help people learn about the various kinds available, lessen bias, and clear up confusion of confusing labels.

5. Summary

Genetically modified food is making its way into grocery stores at a rapid pace due to the worldwide population expansion and growing advanced development of genetically modified technology. Notwithstanding the differences in labeling regulations, the US, the EU, and Japan all actively support their marketing of genetically modified food in their home countries and gain many valuable experiences. For instance, laws of genetically modified food labels shouldn't respond to people only based on what they want, but should be limited by necessity; when putting the labels in place, they should focus on people's right to be informed rather than the safety of the food itself; and a broader scope of measures is required to safeguard individuals' rights.

By drawing on successful international experiences to enrich China's genetically modified food labeling system in terms of clarifying institutional legislative goals, perfecting labeling content, and improving relevant regulatory, relief systems. This is conducive to improve the scientific management of genetically modified foods, encourage consumers' acceptability, and foster the healthy growth of genetically edited industry in China.

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