Comparative Analysis and Enlightenment of Food Safety Supervision System in Advanced Countries

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Abstract: Food safety issues are widespread across the globe, with high levels of public concern and great social harm. In 2019, the Food and Agriculture Organization of the United Nations and the World Health Organization pointed out that approximately 600 million people worldwide are harmed every year by eating unsafe food. Food safety supervision is an important measure to prevent the occurrence of food safety problems. This article uses a qualitative research method to compare the food safety regulatory systems in developed countries and analyze their existing characteristics, to provide experience and lessons for other countries to improve food safety regulatory systems and prevent food safety accidents. At the end of the article, it was concluded that less developed countries should make efforts to improve the supervision mechanism, increase the training of supervisors and update supervision methods.

1. Overview of food safety supervision in advanced countries
Compared with developing countries, the United States, Japan, Germany and other developed countries have earlier started food safety supervision. They have accumulated rich experience in food safety supervision, a more complete supervision system, more advanced supervision methods, more prominent supervision effects, and deserve to be updated and learned by many countries.

1.1 The United States
Regarding the regulatory system, as early as 1906, the United States promulgated the first national legal document regulating food safety regulation, the "Pure Food and Drug Law," which started the legalization process of food safety regulation. In the following decades, the U.S. government successively passed the Federal Food, Drug, and Cosmetic Act, the Federal Meat Inspection Act, the Poultry Meat Inspection Act, the Egg Products Inspection Act, and Food Quality Protection. Laws and regulations provide clear regulatory standards and procedures for food safety supervision. The main bodies of food safety supervision in the United States are mainly the Food and Drug Administration, the Food Safety Inspection Agency, the US Environmental Protection Agency, and the National Marine Fisheries Agency. Each regulatory agency employs professionals such as microbiologists and food science experts to achieve supervision Diversification of the subject and signification of the regulatory process. In terms of supervision, the most prominent feature of U.S. food safety supervision is the realization of full-process supervision, the use of big data technology to realize the information recording of the entire process of food safety supervision, and uploading the entire process of production, packaging, transportation, and sales to a public information platform, real-time supervision and control of food safety from the source.

1.2 Japan
Nowadays, Japanese food is generally regarded as one of the higher safety foods. The Japan Food Safety
Commission is responsible for analyzing potential hazards in food, and coordinating various regulatory agencies in the event of an emergency safety incident. The Ministry of Health, Labour and Welfare, and the Ministry of Agriculture, Forestry and Fisheries carry out specific supervision work. The Consumer Affairs Department does supplementary work related to consumers. The responsibilities of the supervisory bodies are clear and coordinated. In addition to making specific regulations on the responsibilities of various departments to ensure food safety, Japan also provides a monitoring channel for the public. Japan has implemented the two-dimensional code of food traceability. Most of the commodity packaging bags on the market have two-dimensional codes. The public can scan the two-dimensional code to understand the relevant information of the product and ensure that they can buy food with confidence. This method not only improves the public's supervision of food safety, but also helps achieve social co-governance.

![Diagram of Japan Food Safety Regulatory Agency](image)

### 1.3 Germany

The highest food safety authority in Germany is the Federal Ministry of Food and Agriculture, which is mainly responsible for legislation and related policies for food safety supervision. The Federal Ministry of Food and Agriculture has two agencies, the Federal Institute for Risk Assessment and the Federal Consumer Protection and Food Safety Agency. The Federal Institute for Risk Assessment is mainly responsible for providing consultation and writing assessment reports, and the Federal Consumer Protection and Food Safety Agency is mainly responsible for the coordination of food safety supervision and crisis management. Germany strictly adheres to the seven major regulatory principles, including the food chain principle, entrepreneur responsibility principle, traceability principle, scientific and independent risk assessment principle, risk assessment and risk management separation principle, prevention principle, and risk communication transparency principle. In addition, Germany has not only achieved a professional assessment of food safety regulators, but also developed an assessment system for food producers. The government has extremely strict requirements on the quality of professional farmers. It requires that agricultural production practitioners must undergo at least three years of formal education or training before taking up their jobs. After five years of agricultural production, they must participate in vocational skills assessment. Then, they can enjoy various subsidies provided by the state to agriculture. This ensures the safety of food production from the source and greatly reduces the probability of food safety incidents.

### 2. Characteristics of food safety supervision in advanced countries

First, formulate correct food safety supervision standards and systems according to national conditions. Taking the limit of zinc citrate as an example, as shown in Table 1, the original Ministry of Health of China announced in 2013 No. 5 that the limit of lead in zinc citrate is no more than 5 mg / kg, which is stricter than the US Pharmacopoeia standard and other relevant standards in China.
existing zinc citrate related regulations mainly include the original Ministry of Health Announcement No. 2013, the second part of the Pharmacopoeia of the People's Republic of China (2015 Edition), the former Ministry of Health Announcement No. 2010, and the National Drug Standard WS1- (X-092) - 2000Z and Taiwan standards (see Table 1), no cadmium and mercury limits have been established. The United States also does not have a limit on mercury in zinc citrate standards. In the European Union's regulations on the maximum levels of food contaminants, the EU has established general regulations for the limits of heavy metals in food nutrition fortifiers for mercury, cadmium and lead. This requires governments of all countries to update and adjust the food safety supervision legal system in accordance with the characteristics and requirements of different stages of development, so as to ensure that food safety laws and social development are actually in harmony. Most countries with frequent food safety incidents often fail to guarantee food safety due to inadequate legal systems and lack of supervision.

Fig. 1. Comparison of zinc citrate heavy metal limits in relevant regulations at home and abroad (mg / kg)

| Prescribed name | Fe | Pb | Total Arsenic (as As) | Cd | Hg | Heavy metals (as Pb) |
|-----------------|----|----|-----------------------|----|----|---------------------|
| USP38           |    | 10 | 3                     | 5  |    |                     |
| Former Ministry of Health Announcement No. 5 2014 | 50 | 5  | 3                     |    |    | 20                  |
| Pharmacopoeia of the People's Republic of China | 50 | 10 | 2                     |    |    |                     |
| Taiwan Standard | 100| 20 | 3                     |    |    |                     |
| EU              |    | 3  |                       | 1  | 0.1|                     |

Note:- indicates blank data

Secondly, the staff responsible for food safety supervision is highly competent and has clear responsibilities. Most countries where food safety supervision measures are more effective have made certain requirements for food regulators, from the selection of staff to training at the early stage of work, and have formed certain regulations. Some countries have neglected the requirements of food regulators in the process of food supervision, resulting in improper operation and unskilled processes in the process of supervision, leading to a greatly increased probability of food problems.

Finally, food safety supervision technology is advanced and covers a wide range. For example, countries such as Japan have enabled two-dimensional code tracing to achieve universal supervision of food. Making full use of big data and artificial intelligence technology are important means in current food safety supervision. Through the recording of food production information, the inspection of food packaging, the control of food circulation and sales, the food is guaranteed in each process of food production.

3. Enlightenment from the establishment of food safety supervision system

Establish a complete food safety supervision system and form a scientific supervision standard mechanism. The first is to further clarify the legal requirements for food safety and social co-governance, and to provide a legal basis for the promotion of multiple and coordinated governance of food safety; the second way is to further improve the whole process of food safety supervision mechanism by referring to the United States' "past garden to table" whole-process supervision principles; Strengthen the construction of food safety standard system, so that the entire process of the food chain has a unified production or inspection technical standards; the fourth is to formulate specific implementation rules for food safety supervision and improve the enforceability of food safety laws and regulations. Strengthen the supervision concept of pre-event prevention and in-event control; establish a food safety monitoring early warning mechanism focusing on prevention; learn from the successful experiences of developed countries; build a sound food safety risk assessment system; strengthen risk information exchange. Other than that, establishing a rapid warning mechanism is also a good method. After the risk assessment system determines food safety risks, the government should quickly start the food safety risk monitoring and early warning mechanism. By the rapid warning mechanism, the relevant departments should ensure that the identified early-warning programs are handled, and emergency measures such as issuing dangerous information, stopping sales, and recalling problematic food are taken to control food safety.
risks in the bud state.

Increase training for food safety supervisors to improve the effectiveness of supervision. The establishment of a sound food safety supervision legal system and efficient food safety supervision execution are inseparable from the support of a high-quality and capable food safety supervision team. The improvement of food safety standards in the new era has made people have higher requirements for the quality of food safety supervision teams. On the one hand, every country should attach importance to the education and guidance of food supervision staff, regularly organize relevant personnel to study abroad and advanced food companies, organize various forms of food safety supervision training activities, and formulate corresponding food safety supervision reward mechanisms. To stimulate the enthusiasm and initiative of food safety supervisors, the government has a lot of work to do. For example, regulators need to not only strengthen self-learning capabilities, but also continuously raise awareness of food quality supervision. With a deep understanding of the importance of food safety issues, regulators make full use of their spare time to strengthen learning and continuously enhance theoretical knowledge and practical skills. Only then can regulators reduce mistakes at work.

Constantly update the supervision methods of food safety to form food safety prediction and early warning. Relevant departments should establish an information disclosure platform as soon as possible to improve the transparency of food quality and safety information and regulatory information. As the identification, assessment and response of food safety risks need to process and improve a large amount of information, it is necessary for the regulatory authorities to establish an authoritative information disclosure platform and release it after integrating and classifying the information. At the same time, the supervisory authority can also establish an information feedback mechanism to improve public participation. This method can not only play a role of public supervision and promotion, but also achieve a positive interaction between various stakeholders.

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