

# Study on Supervision Control System for the Risk of Food Supply Chain

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**Abstract**—Food supply chain involves in the production, consumption, processing, circulation and other links of primary agricultural. Any improper control of links will affect the final quality of products; even jeopardize the of consumers. So the treatment of food supply chain safety relied on the concerted efforts of all participants. The implementation of food supply chain management can solve this problem effectively. But in the operation of the food supply chain, the occurrence of some risk factors often lead to the supply chain and enterprises are facing a crisis, recognize these risk factors, and take the necessary measures to against the risk has becoming a major task to the whole society.

**Keywords**—supervision; safety control; food supply chain; risk

## I. INTRODUCTION

The so-called supply chain is to focus on core business and control of the information flow, logistics, and capital flow, from procurement of raw materials, made of intermediate products and final products, by the sales network to deliver products to consumers in the hands of the supplier, manufactures, distributors, retailers, until the end-users together into a whole functional network chain structure mod-el (Shi-hua, 2000). Food supply chain refers to various aspects of food formation and transfer processes involved in agricultural production, food processing, distribution and final consumption, etc that build up the production and supply network system. Based on this chain, a large scale and the strength of food processing enterprises are usually becoming the core of business.

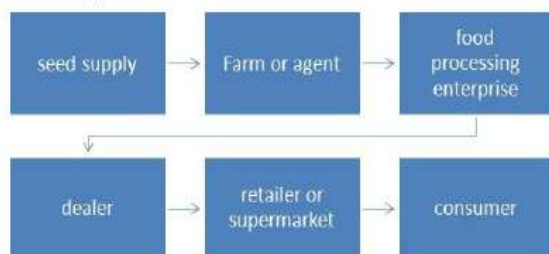


Figure 1: Present food supply chain structure

This paper attempts to discuss the status of the food supply chain, the development status and the problems of food supply chain management. There are many food safety issues at home and abroad. the relationship between the governance framework of the food supply chain and quality information has been

discussed the exchange of information between the main and final consumers of the supply chain and the implementation of the cost of the system of quality management system.

## II. FOOD SUPPLY CHAIN SAFETY CONTROL ANALYSIS

The meaning of harm refers to biological, chemical or physical agents or conditions caused by the potential negative impact on health. The harmful effects of food production including the case of metal scrap (physical), pesticides (chemical) and microbial contamination, such as bacteria, etc. (life). Today's food industry faces a major hazard is microbial contamination, such as Salmonella, ecological Oxygen 157, H7, preservatives, germ bacteria, and etc..

Traditional food safety control process generally based on focus to inspect the final product testing, etc., through "look, smell, cut" approach to find potential hazards, rather than a way to take precautions, so there are some limitations.

For example, the time required to complete food processing work, relying on intuition to predict potential food safety problems in the final product of costly inspection, in order to obtain meaningful, representative information, the collection and analysis. There is enough larger samples more difficult.

## III. FACTORS WITHIN EXISTING FOOD SUPPLY CHAIN

### A. Difficulties in Monitoring the Quality

If the supply chain with a small number of node enterprises, but with a large scale, and stable cooperative relations, it is likely to generate trust between enterprises, enhance mutual understanding, so that the product quality Control throughout the entire chain will be easier. Conversely, quality control will be very difficult. By above knowledge, unlike large-scale production in Europe and the United States, China has a numerous of food supply chain node, where small-scale production represent the majority. Moreover, between enterprises most are short-term or even onetime cooperation, along with lack of trust and understanding between upstream and downstream enterprises, plus the wide and dispersive monitoring arrange increases the difficulty of food safety control, as well as the cost of monitoring.

### B. Barriers of Information Transmit

Even a strict supervision cannot guarantee 100% food safety. Once a node enterprises has a food safety issue, first and foremost to the cooperative enterprises is to pass

on information to avoid problems spreading and minimize the loss of the supply chain as a whole. However, from the status of national food supply chain, the numbers of participants are dispersed; the level of information is serious shortage of, plus without information sharing system, results in slow transmission of information, content delivery distortion. Once any aspect of food safety issue occurs, the response of the entire supply chain will be seriously lagging behind the un-estimated loss.

*C. The maturity of china's food supply chain businesses is low*

Our country at small scale food production enterprises, the threshold low, low degree of standardization, food safety has become the root cause of the incident. Our country for quite a number of food enterprises, production, sales did not form, procurement in the absence of a strict licensing system, unable to assess the number of supplier, comparison, inspection and management, often from the short-term interests, not with the supplier to establish long-term partnership, with the result that cohabitation supplier, a large number of inferior goods occupy a place in the City, endanger the consumer. In inventory management is static, single-stage and can not be shared in the supply chain resources, lack of food safety management and control.

*D. Our food supply chain standards and system-related security standards such as agricultural products, food inspection system, food quality and safety evaluation index system are not perfect*

Our country at February 28, 2009 has just been issued by food safety law from June 1 this year, only started to implement, one of the country involved in the establishment of food safety risk detection system in our country has just started. At present our country to adopt international standards in the food industry, representing a ratio of 55 percent, but domestic standards with international standards is also a considerable distance. China's agricultural products retroactivity standard the basic or blank, that is, our country at the source of food raw materials are not enough specific, the lack of a transparent mechanism, and in fact, China's aquaculture industry and the plant sources of pollution on the food safety threat are the largest.

*E. Food supply chain logistics system is relatively backward*

China's food source and enterprise coverage in rural and urban, developed areas and backward areas, together with the rural logistics infrastructure, equipment and other factors behind, making the logistics system from the perspective of food safety to optimize the job difficult. Our country a lot because of agricultural and sideline products in circulation, one of more than 80% of the fresh foods are taken to preserve ambient temperature, circulation and the beginning of the processing means, which will result in the process of logistics and transport of food spoilage and contamination, such as health and safety problem, and our country's cold chain logistics and infrastructure are lagging behind in perishable cold food from the origin of fresh acquisition, processing, storage until consumption of the various aspect and cannot be

completely in the cold chain environment, resulting in potential safety problems of food quality.

**IV. SUPERVISION CONTROL SYSTEM FOR THE RISK OF FOOD SUPPLY CHAIN**

Food safety issues are of consequence, which need for government, society, the media and consumers together to resolve.

This system is supposed to realize the full Potential of the government, the industries and society, by understanding the status and interactivity of all the participants in charge of food safety. This structure establishes the dominant position of the government, and the industries especially the core companies join work main practitioner. At last the society is responsible for supervising the reform as the third party.

*A. Food supply chain safety supervision information system*

The supervision information which designed is not only the foundation to develop national food safety policies, laws and regulations, but also a modern food safety assurance system for the important content related to social stability and food trade. At present, China's food safety information, mainly from three aspects: information is released from food safety supervision of government; information is released from the food producer; information is released from intermediary bodies such as food trade associations.

However, the existing food safety information released in the quantity and quality of the overall level is still relatively low, the processing of information processing and utilization is still at a lower level. In order to further achievement of food monitoring, control and monitoring to provide information supporting, a food safety information system need to be established for the food safety to the release of information, recommended high-quality food, announced corporate integrity, disclosure of substandard food and its producers, the creation of a good food consumer market environment, to meet the needs food safety information of consumers, producers and managers.

*B. Through legislation, law, law enforcement to strengthen the food safety management*

Government should establish and improve a variety of laws, regulations and rules and regulations to ensure the quality of agricultural products and food safety. Our country's food safety management has played a landmark role. For improving the status of China's food safety, and enhance enterprises, national food safety awareness has played an important role. Compared to our country in 1995 to implement the Food Sanitation Law, the new food law enacted mainly in the following five aspects to build a food safety law to protect: First, the highest regulatory body set up --- the establishment of food safety committee of the State Council on the food safety supervision coordination and guidance, aimed at strengthening coordination among departments and to eliminate regulatory gaps. Second, Safety Evaluation by the "ex post factor" referred to "advance" the relevant department should be monitoring the risk of food ahead of time points, active surveillance of food borne diseases, food contamination

and harmful factors in food testing, to prevent harm to human health. Third, GB formulate a unified food safety food law clearly formulate a uniform national standards for food safety principles, requirements of health administration department of the State Council on the existing food safety standards for the quality of agricultural products, food hygiene standards, food quality standards to be integrated, unified publication for food safety national standards. Fourth, is strictly prohibited without permission to add food additives food additives should be technically it is necessary after a risk assessment and proven safe, reliable, and can be included in the scope of the use permit; Shall not be used in food production outside of food additives and other chemical substances may endanger substances to human health. Fifth, the implementation of food recall system for food safety law requires that operators of food production to deal with social and public accountability, and ensure food safety, to accept social supervision, and commitment to social responsibility.

### C. *Society participation*

The society media should play an important role in new food safety system. The existing system is lack of social supervision. In the new one, government and industries will corporate closely with the society media, which promotes the food information disclosure.

- The society will transform from the passive to the active in food supply chain. The easier access to food information avails the social supervision through institution belonging to the government and media.
- Media is an effective channel of information disclosure. The media can use the feature of a wide range of audience to Form a pressure of public opinion to disclosure of food safety incidents, and it also can contribute to the popularization of food safety knowledge.
- Society organizations mainly consist of consumers association, various industries association and some other non-government organization, their unique influence on specific field will improve the reliability of food safety system.

### D. *Improve the efficient management of the food supply chain*

As an important part of food safety supervision and management system, the food supply chain is the carrier of the influencing food safety factors. Therefore, the food supply chain management cannot be in isolation but should be placed to consider the whole regulatory system. It should be compatible with government, industry, food safety supervision and management system, making the entire run of the regulatory system more scientific and effective.

New food safety law enacted in the food production strengthened the operators should bear the idea of social responsibility. We can take this as opportunity, the introduction of advanced supply chain management thought and the technical means to carry out China's food safety control of the whole process of research, to ensure

that the food supply chain in all aspects of a good run, reduce food safety risks. First of all, electronic food supply chain management for food safety has provided technical support. On the one hand, the adoption of Web technology integration, a complete food production, processing, transportation and sales process information will be a true record, which will greatly facilitate the impact of food safety information monitoring; On the other hand, electronic the food supply chain to respond quickly to the characteristics of the timely detection of problems and determine the reason plays an important role. Food safety in the event of a rapid response after the problem, not only clearly define the food supply chain at different stages of the main responsibilities related, but also a reduction of consumer concerns and panic. Secondly, EAN UCC (unified global identification) system for food safety provides a retrospective platform. EAN UCC system is through the food supply chain at every node, not only requires the processing of their products into a logo, but also the acquisition of raw materials by processing information on the existing logo, and all of its logo on the information processed into Products of up to prepare for the next aspect, thereby forming the chain connected. As long as the adoption of consumer information retrieval tools can be at any time know the entire food production, processing, transportation and sales, which will greatly enhance consumer confidence in food safety. Third, RFID (radio frequency identification technology) are a good solution to track the entire process of food options. RFID system will not only be able to ensure that the food supply chain management process of high-quality data exchange, but also enable completely transparent food supply chain. In a complex, multi-step supply networks, RFID systems established at the source to the consumer throughout the process of reliable inter-contact for the conduct of food safety provides a good retrospective of the norms.

### E. *Coordinated supply chain collaboration*

The good relations of cooperation will help to achieve our common goals and expectations, thereby reducing the external influencing factors and the corresponding risks and achieving economies of scale. It will weaken the entire supply chain system performance if the individual targets of upstream and downstream enterprises in the food supply chain are inconsistent with the overall goal of supply chain systems. The food supply chain management is a management model of treat the member enterprises as a whole, mutual cooperation, information sharing, value-added supply chain, lower total system cost of supply chain management. Specifically, it is a formation of close ties of cooperation for franchise, long-term contracts between food production, processing and retail, which will enable to improve the efficiency of food supply chain, reduce the various kinds of uncertain information and improve the rapid response capability.

## V. CONCLUSIONS

The principles and methods of food processing microbiology, quality control and risk assessment are used in HACCP, and analysis the existence and potential hazards in food raw materials, processing, packaging, storage and transportation, the actual sales process,

determine to find out the final key food quality influential part and take appropriate control measures, so that safety of foods in the danger area to a minimum. Application of history and the ability of occurrence of places can be traced back to restore the production through the food supply chain safety traceable system, and found that most of the food chain terminal. The root causes of issues can be identified and timely implementation of product recall or withdrawal. The establishment of food supply chain safety of information systems can be further realized food monitoring, surveillance and monitoring to provide information support to the release of food safety information, recommended high-quality food, announced corporate integrity, disclosure of substandard food and its producers, the creation of a good food market consumption environment, to meet the food safety information needs of consumers, producers and managers.

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