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Causes and Solutions of Cold Chain Logistics Chain Fracture

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Abstract: In recent years, with the continuous improvement of the living standards of Chinese residents and the deepening of their awareness of food safety, the quality and safety of fresh agricultural products have become a highly concerned and valued topic. This article takes fresh agricultural products as the research object, and takes the relatively high loss rate of fresh agricultural products as the problem orientation. It explores the essential reasons for the "chain breaking" of cold chain logistics of fresh agricultural products, and attempts to find a path to avoid the chain breaking of cold chain logistics of fresh agricultural products in China. The aim is to fundamentally build a smooth cold chain logistics operation mode of fresh agricultural products, thereby reducing losses in the circulation process of fresh agricultural products, To achieve high efficiency and efficiency in the cold chain logistics operation of fresh agricultural products, ensuring the quality and food safety of fresh agricultural products.

1. Introduction

Fresh agricultural products are indispensable necessities in the daily life of Chinese residents. In recent years, with the continuous improvement of the living standards of Chinese residents and the deepening of their awareness of food safety, the quality and safety of fresh agricultural products have become a topic of great concern and attention [1]. China's cold chain logistics is imperfect in technology and norms, which leads to the "broken chain" of fresh food cold chain becoming a normal state, and the risk of cold chain interruption is gradually increasing. According to the data of China Statistical Yearbook in 2022, the total output of fruits, beets, eggs, meat and aquatic products in China was 595.091 million tons in 2021, an increase of 3. 55% compared with 2012. However, according to the report on the development of cold chain logistics in China in 2021, the loss rate of fresh agricultural products in China is 27% for fruits and vegetables, 14% for meat and poultry and 19% for aquatic products [2]. In order to compete for the market, some small and medium-sized enterprises can only reduce their operating costs without government support, and it is inevitable that there will be irregular behavior in cold chain operation [3]. Considering the cost, many enterprises often choose to turn a blind eye to various problems in the transportation process. The city's large supermarket chains have a strong development momentum, and the establishment of various supporting cold storage facilities for retail terminals and the improvement of cold chain equipment technology have promoted the development of frozen food [4]. In addition, the "cold chain" of catering launched by the railway department has diversified the types of food on the train,

and also given more market space to the frozen food industry of cold chain logistics of fresh agricultural products, thus reducing the loss in the circulation process, realizing the high efficiency and high benefit of cold chain logistics operation of fresh agricultural products, and ensuring the quality and food safety of fresh agricultural products [5].

2. Reasons for the formation of "broken chain" in cold chain logistics

2.1. Illegal operations under malicious competition

Some companies, in order to save costs, require drivers to deliberately lower the temperature in cold storage and refrigerated vehicles, or turn on and off the air cooler for a while, or even install a temperature gauge at the air outlet of the air cooler. It is precisely because of these non-standard operations that the cold chain is "broken". When pre cooled products are loaded onto refrigerated transport vehicles from cold storage in the production area of fresh agricultural products, many cold storage rooms do not have closed low-temperature platforms, which results in fresh agricultural products being exposed to room temperature or high temperature during the outbound loading process [6]. The cold chain of fresh products currently experiencing chain breakage is shown in Figure 1.

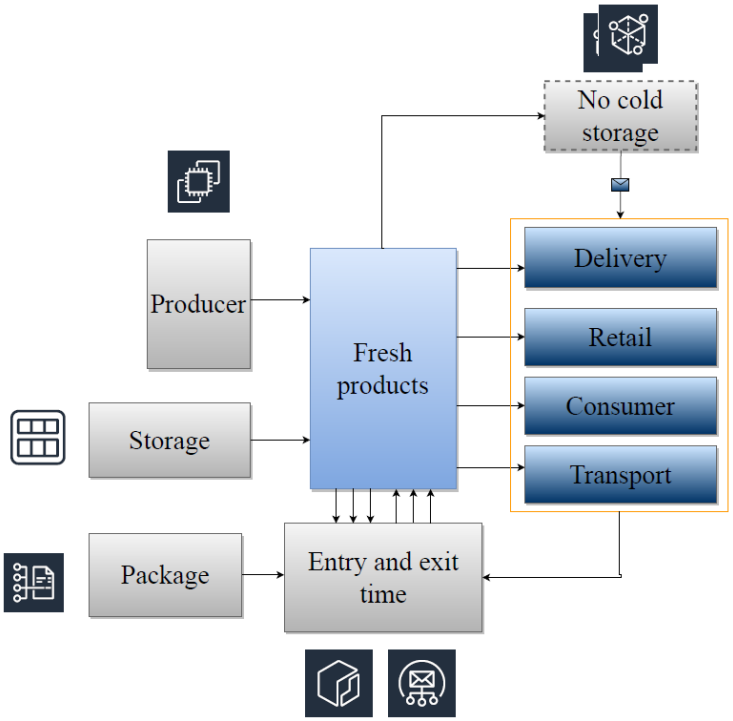

Figure 1: Fresh food cold chain "broken"

The integration and resource sharing of cold chain logistics facilities in aquatic product production areas are low, and the regional control characteristics are obvious. The advantages and characteristics of graded packaging in aquatic product production areas and the development of supporting fresh storage and transportation facilities are not flexible enough. At the same time, due to the fact that the transfer capacity of general refrigerated transport vehicles is above the tonnage, and the loading and unloading workers of enterprises usually arrange about 3 people for loading and unloading, and the loading and unloading equipment is mostly manual forklifts, which requires a certain amount of time for loading and unloading[7].

2.2. Weak awareness of cold chain

Most consumers still pay more attention to the price factor, which leads to the concept of cold chain logistics being unfamiliar to manufacturers, downstream customers and ordinary consumers, and they have a weak sense of cold chain logistics, and they don't realize the importance of cold chain logistics for food safety, which leads to the delay in opening the cold chain market demand and turning a blind eye to the illegal operations in many cold chain logistics links [8]. The chain breakage operation process design, lack of professional cold chain facilities and equipment, or the irregular operation of enterprises and employees from the perspective of behavior [9]. According to the data of the Development Plan of Agricultural Products Cold Chain Logistics in 2022, there are 8610 mechanical refrigerated trains, 50000 mechanical refrigerated cars and 500000 tons of refrigerated ships in China. Comparing the data of China Statistical Yearbook in 2021, it shows that there is a significant shortage of refrigerated transport vehicles in China, as shown in Table 1.

Table 1: Analysis of the proportion of refrigerated transportation vehicles and circulation vehicles

Name	Number	Proportion
Mechanical refrigerated train	8610	13.45%
Locomotive	54856	
Mechanical refrigerated vehicles	50000	0.42%
Highway operating vehicles	20701900	
Tonnage of refrigerated vessels	50	0.17%
Civil transport vessel	46798.4587	

The growth of cold storage is unbalanced, which is not much reflected in the province, but it can be clearly found nationwide that the growth and increment of East China accounts for the largest part of the growth increment of domestic cold storage, while the new increment and total amount of cold storage in other agricultural product production and consumption regions are obviously insufficient [10]. Broken chain makes it difficult to achieve seamless connection between various links in cold chain logistics, and fresh agricultural products have the characteristics of being perishable and perishable. The combined effect of the two causes excessive logistics losses and serious resource waste in fresh agricultural products. Demand determines the market, and the market drives development. Only when consumers have a genuine demand for quality of meat products, fruits and vegetables, dairy products, etc., can the gap in the cold chain market be opened, and ultimately drive its development and progress[11].

2.3. Poor market regulation

China's cold chain logistics presents the phenomenon of "small, scattered and chaotic", coupled with market management and low customer requirements, but it is greedy for cheap and lacks strong supervision. The local market supervision administration believes that the cold storage has failed to fulfill its main obligations and has defects in claiming certificates and tickets; When this batch of meat comes in, if the cold storage fulfills its main obligations, it should also be able to hold this pass. It can be seen that cold chain supervision is not only the business of cold chain logistics implementation enterprises, but also the responsibility and obligation of affiliated enterprises of cold chain. Because there is no temperature control record, once a logistics link is "broken", it is difficult to find out which link is the problem. Social logistics enterprises engaged in the logistics business of cold chain drugs must be included in the compulsory supervision of GSP. There are clear legal norms on the operation and basic requirements of cold chain logistics, but from an

interview with Qin Yuming, executive deputy at least in terms of road transportation, the relevant regulatory authorities only supervise whether it is overloaded or not, and whether certain temperature control is adopted is still unsupervised, which leads to the relevant participants in the operation of fresh agricultural products ignoring and not implementing the industry standards.

3. Countermeasures for "Broken Chain" in Cold Chain Logistics of Fresh Agricultural Products

3.1. Establishing the concept of supply chain

In order to reduce the cost of vehicles, some cold chain enterprises maximize the loading of each vehicle and increase the distribution points of vehicles, which seems to increase the loading rate, but due to the increase of distance and unreasonable routes, the running time and fuel consumption of vehicles have not decreased. To prevent the "broken chain" of cold chain logistics, we must attach importance to the role of consumers, improve the cold chain logistics concept of consumers and enterprises, and strengthen the emphasis on cold chain logistics and unified distribution. The cold storage in the place of origin should develop towards the trend of diversified structure and invest in construction according to local conditions. For the problems that cannot be effectively solved by the simple market interest mechanism, we can consider using the financial strength of the central and local governments as the infrastructure construction to highlight its public welfare. Specific measures, such as the government to increase the publicity of the importance of cold chain logistics to food safety, improve people's awareness of the cold chain. Therefore, cold chain logistics must be optimized as a whole. This requires the government and logistics enterprises to consider the whole operation plan from the source to the terminal, and at the same time, fully communicate with upstream and downstream customers to understand the supply law of customers.

3.2. Developing advanced refrigerated transportation equipment

To rapidly improve the level of cold chain logistics in China, it is necessary to develop advanced refrigerated transportation equipment. The support for promoting the development of modern cold chain logistics systems is the increasing investment of governments in various countries, mainly through preferential policies and financial support. The growth rate of cold chain logistics cargo volume in China is accelerating. Among the products that require temperature control, the food industry alone has an annual demand of about 100 million tons, with an annual growth rate of over 8%. The development prospects of cold chain logistics have attracted widespread attention in the industry. Improve the level of information technology, strengthen the acquisition of source information, achieve a perfect combination of demand and supply, and do a good job in unified distribution and the entire cold chain driven by interests. At the same time, we will establish a group of efficient, large-scale, and technologically new cross regional cold chain logistics distribution centers, and cultivate leading cold chain logistics enterprises with strong international competitiveness. In order to improve the precooling effect, it is necessary to consider not only the progressiveness of the technology, but also the applicability of the technology when introducing and applying the precooling technology according to the category, quantity and maturity of agricultural products, combined with the comprehensive consideration of climate, cost, time and other factors, select the appropriate precooling technology, and formulate the guidance plan for the precooling technology in the production area. Most of the hardware facilities of Third-party logistics remain at the traditional level, and the new high cost cold chain equipment is out of reach. This requires the government to increase the planning and investment in the hardware facilities of cold chain logistics. One way is to re plan the original, transform and update the refrigeration equipment, and upgrade

them.

3.3. Establish corresponding cold chain logistics standards

Providing financial support for major logistics infrastructure by formulating relevant laws and regulations, and subsidizing transportation enterprises to purchase standard containers; Through the formulation of "Packaging Law" to standardize the packaging premise of timely introduction of policies, availability of funds and continuous improvement of planning system, strict supervision should be carried out to avoid food and drug safety accidents and waste of resources. In the process of trunk transportation of fresh agricultural products, transport vehicles need to be unpacked for inspection after passing through the "green passage", which is time-consuming and will directly expose the inside of the box to the external environment when opening and closing the door, breaking the constant temperature management. The transportation distance in the distribution link is obviously shortened, but it is limited by more scene conditions. Under the complicated traffic conditions in the city, more specific and feasible guidance schemes are needed for the traffic and parking policies of fresh delivery vehicles. There is also a strict inspection and certification system for the import and export of agricultural products, which is highly operable and testable. We can learn from it, formulate mandatory industry standards, unified standards for drug coding, etc., to ensure the standardization of cold chain logistics technology, strictly control the operation of each link of the cold chain, and ensure the quality and safety of food in each link.

4. Conclusions

Refrigerated and frozen foods require a complete cold chain logistics for temperature control throughout the entire process to ensure food safety. In the entire process of cold chain logistics, any missing or uncontrolled link can lead to changes in product quality, which in turn leads to public health and safety issues. From another perspective, the development of the logistics industry will have a certain impact on regional economic development, and the construction of a standardized and reasonable logistics system can greatly improve the quality of regional economic development, thereby ensuring stable progress of the regional economy. Early built cold storage can be appropriately renovated and upgraded, and old hardware facilities can be updated to increase the structural proportion of high-level warehouses in the cold storage. In addition to the basic requirements for certificate compliance, high-level warehouses also need to pay attention to the construction of closed platforms, three-dimensional shelves, tally halls, epoxy flooring, forklift charging rooms, temperature monitoring and other equipment. Operators should provide macro guidance for cold chain logistics, establish and improve a series of standards such as quality monitoring of refrigeration and refrigeration, temperature and cleanliness control of cold storage environment, hygiene management and packaging technology, temperature control of refrigeration transportation, food safety, etc., to create a healthy, orderly, fair and just environment for its development. By strengthening cold chain standards, supporting third-party cold chain enterprises, enhancing chain members' understanding of cold chain, and strengthening the whole process monitoring and traceability system engineering of cold chain, the losses caused by cold chain breakage can be reduced.

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