Design of agricultural product quality safety retrospective supervision system of Jiangsu province

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Abstract. In store and supermarkets to consumers can trace back agricultural products through the electronic province card to query their origin, planting, processing, packaging, testing and other important information and found that the problems. Quality and safety issues can identify the responsibility of the problem. This paper designs a retroactive supervision system for the quality and safety of agricultural products in Jiangsu Province. Based on the analysis of agricultural production and business process, the goal of Jiangsu agricultural product quality safety traceability system construction is established, and the specific functional requirements and non-functioning requirements of the retroactive system are analyzed, and the target is specified for the specific construction of the retroactive system. The design of the quality and safety traceability system in Jiangsu province contains the design of the overall design, the trace code design and the system function module.

1. Introduction
As the quality and safety of agricultural products directly affect the health of the public, social harmony and the healthy development of the national economy, so the problem to the government and the public attention. Agricultural standardization refers to standardization activities targeted at agriculture [1]. It is a kind of unified activities for the development and implementation of standards for all kinds of objects in agricultural economy, technology, science and management activities. A comprehensive technical basis for agricultural modernization is agricultural standardization. The quality of agricultural standards is not perfect, is not conducive to ensuring the quality and safety of agricultural products, improve the market competitiveness of products [2]. The establishment of agricultural enterprises agricultural product traceability system, the use of agricultural information technology, is conducive to promoting the process of agricultural information; promote agricultural standardization [3]. The traceability of fruit and vegetable agricultural products refers to the information from the downstream of the supply chain, which is traced back to the orchards and farmers located in the upper reaches of the supply chain [4]. The process information such as planting, processing and transportation of the fruits and vegetables products is obtained by recording the identification. Consumers or sellers package products to its base production and sales of the status of the traceability. Therefore, the retrospective can not only be used to identify product quality problems, but also can learn other excellent products management production technology.

Traceability system is a kind of product history, use or location and other related information to record storage quality assurance system [5]. In the whole process of product supply, the quality traceability system can quickly and effectively query the problems in the raw materials or processing problems in the event of product quality problems, so that when necessary, product recall can be carried out, or the implementation of targeted penalties, and thus to ensure product quality.
2. System Design

Traceability of the system needs to be achieved from the production site to the sales of each link can be traced each other, that is, the need to establish a database record agricultural production, business records. Information on producers, base environments, the use of agricultural inputs, field management, processing, packaging and other information, and open to consumers, so that producers, consumers and distributors through the coding and query related to the quality and safety related information. The process of traceability of agricultural products is carried out around the life cycle of agricultural production management. The life cycle includes planting, picking, processing, transportation and other production processes and activities. The life cycle of agricultural production management is shown in Fig.1.

![Figure 1. Jiangsu agricultural production management of the life cycle diagram](image)

Jiangsu agricultural product quality and safety traceability system is mainly through the Internet to build products traceability system. The information on the picking, processing and transportation of agricultural products is entered for retrospective and inquiry. Consumers, wholesalers through the tracing code, the product cultivation, picking, processing and transportation related information to query, the quality of the existence of complaints.

Ease of use requirements are one of the important non-functional requirements that this system is designed to consider. System interface is the user and the server data exchange between the media. As the system users for the cooperative management staff, joined the farmers and consumers, computer operating level is low, so the interface design to facilitate the operation, highlighting the ease of use. Functional plate boundaries clear, so that users of the plate can easily to use it.

3. Implementation of Specific Processes

The non-functional requirements of the system refer to the specific requirements of the software products in addition to the necessary functional requirements, such as the system application environment, hardware environment, etc., which are important basis for the impact of non-functional requirements. The non-functional requirements of this system focus on ease of use, security, and implementation requirements. Picking the information management system, the picking navel orange picking time, plots, quantity, traceability and pesticide residue detection corresponding to the entry, so that the future use of traceability. Picking information / management business process shown in Figure 2.
The system use the telecom center room hosting server, the establishment of data center, the server bandwidth of 100 trillion, in addition to the establishment of data collection center in the planting base. Through ADSL, wireless networks, etc. access to the Internet to access the server. At the same time with the Internet and GPRS network, through the touch screen, website, mobile source terminal, etc., to provide consumers with agricultural product quality and safety traceability. The server hardware configuration is shown in Table 1.

### Table 1. Server Hardware Configuration

| Accessories | Specific parameters |
|-------------|---------------------|
| processor   | CPU Model: Xeon E5335  
CPU frequency: 2GHz  
Standard CPU Quantity: Standard 1 xeon E5335 processor  
Maximum number of CPUs: 2 stars  
L2 cache: 2 * 4MB  
Bus specification: FSB 1333MHz |
| Motherboard | Motherboard chipset: Intel 5000p  
Expansion slots: 4 optional PCI-Express slots |
| RAM         | Memory type: FB-DIMM  
Memory capacity: 2GB  
Maximum memory capacity: 32GB |
| Storage     | Hard disk interface type: SAS / SATA  
Standard hard disk capacity: standard does not provide  
Hot-swap disk: support hot-swappable  
RAID mode: 256MB HP Smart Array P400 controller (RAID 0/1/1 + 0/5)  
CD-ROM: optional DVD, DVD / CD-RW combination drive  
IDE controller: ATA 100 |

4. Coding and Implementation of the Trace Chain
Based on the analysis of the actual production and processing process of agricultural products, this study draws out the Jiangsu agricultural production and processing business model: from the initial planting, after picking, and then enter the basis of the agricultural production traceability. First, warehouse, in the production and processing, from the warehouse to extract Jiangsu agricultural products into the
production workshop, second, a series of production processes, by the quality inspection staff during the inspection, and then the finished product packaging, and finally the circulation of the transport and final for sale.

Based on the research process of Jiangsu agricultural production process, the paper designs and designs the Jiangsu agricultural product quality tracking and traceability coding system with batch as the core, and links the agricultural production process information in Jiangsu through various links: picking link, processing link, transportation link and sales link of the batch number to connect, the next link contains information on the previous link, through the batch number, can be easily traced back. And finally designed to "product trace code sales batch number, transport batch processing batch number picking batch number origin code" for the chain of the retroactive program, which not only increases the consistency of information, but also easy to understand, At the same time in Jiangsu agricultural products traceability can quickly access all aspects of the quality and safety information, the specific process shown in Figure 3.

Figure 3. The retroactive process based on the batch number

Which is based on the data centre as the core of the retrospective link, the data centre mainly stores the whole process of Jiangsu agricultural products such as the use of inputs, production, processing, storage, transportation, sales and other aspects of quality and safety information, with the Internet and GPRS network, Website, mobile tracing terminal, etc., to the consumer, Jiangsu agricultural products processing enterprise management personnel, and quality supervisors through the Jiangsu agricultural product quality and safety traceability code, access to the product quality and safety information to the data centre as the core of the retrospective program as shown in figure 4.
System design is the core of system development; the process is to use the results in the system requirements analysis, the target system of the logical model into a physical model. According to the basic function of Jiangsu agricultural product quality safety traceability system, the retroactive system design basic information management subsystem, fertilization information management subsystem, drug information management subsystem, agricultural information management subsystem, picking information management subsystem, processing information management subsystem, Transport information management subsystem, user information management subsystem, retrospective query subsystem, a total of nine subsystems. Among them, the product number design as shown in Figure 5:

![Figure 4](image)

**Figure 4.** The retrospective based on the data

**Figure 5.** Design of agricultural products number

### 5. Conclusions

The establishment of quality and safety traceability system is the agricultural enterprises to participate in international market competition, breaking the trade barriers, enhance the brand value of the inevitable trend. The construction of agricultural enterprises through information construction, especially the traceability system of agricultural products, can avoid the bottleneck of development after increasing the operation cost of agricultural enterprises to a certain scale due to the increase of farmer and production area. At the same time, through the retrospective system and the Internet and other information means to promote the standardization of agricultural production, improve product quality and enhance the competitiveness of agricultural enterprises in the market.

This paper designs and realizes the traceability system of Jiangsu agricultural product quality and safety based on B / S structure. Based on the current situation and the business of Jiangsu agricultural products, the system establishes the construction goal of Jiangsu agricultural product quality safety traceability system, analyzes the functional requirements and non-functioning requirements of the system, and designs the functions on the basis of the demand analysis, including the overall design, System function module design, retrospective chain coding system design and other aspects of the design, in order to achieve its Jiangsu agricultural products in the cultivation, picking, processing and
transportation and other aspects of the quality and quality of traceability, and through the results back to the farmers to achieve the process of planting for standardized management.

6. Acknowledgments

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7. References

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