Control and Management of Electronic Records of Information of Agricultural Products Circulation

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Abstract. To achieve the sharing and use of the information of agricultural products circulation, and enhance the efficiency of the circulation of agricultural products, this paper explores the control and management of electronic records of information of agricultural products circulation, and brings forward the content of electronic records of information of agricultural products circulation, management requirements and control measures so as to provide guidance on building the electronic recording system related to agricultural products circulation. On the basis of analyzing the present situation and trend of development of biotechnology, this paper inquires into the effect of establishing the standard system of biotechnology and the content of standardization of biotechnology, utilizes the principle of establishing the standard system, establishes the standard system of biotechnology based on the methods such as the level, the target control and so on, offers the suggestions of building the technical supporting institution, and provides the reference in the aspects of reducing the repeat and contradiction between the standards, increasing the efficiency of standardization management of biotechnology and so on.

Introduction

With economic development and the enhancement of people’s living standards, consumer demand for agricultural products has further enhanced and the scale of circulation further expanded. On the one hand, consumers are no longer satisfied with quantitative supply, but seeking high-quality, safety and convenience; on the other hand, traditional business model is still used for circulation of agricultural products, which is featured by high cost and low efficiency, and the quality and safety cannot be guaranteed. Driven by the integrated circulation pattern and new mode of agricultural transactions such as e-commerce, futures, and auctions, the many stages of agricultural products circulation, bad coordination between the standards of the many stages, and the poor operability have led to the difficulty of controlling the quality and safety of agricultural products, and high rate of cargo damage. It has become a major bottleneck in the quick flow of agricultural products, and ultimately pushed up the price of agricultural products. Therefore, to solve this problem, the system of electronic records of information of agricultural products circulation which covers production, distribution and sales needs to be set up so as to achieve the integration of business flow, logistics, and information flow.

Current Status of Electronic Records of Agricultural Products Circulation

Electronic records refer to the handling of electronic information through the computer such as modifying, creating, maintaining, transmitting or filing. The information is mainly in the form of images, sounds, data, texts or icons \cite{1}. Information standardization of agricultural products circulation lays the foundation for building the traceable system for the quality and safety of agricultural products. There are varieties of agricultural products which are vulnerable, and the agricultural products circulation involves many stages and companies. The disunity among the stages
and companies in terms of the records of circulation information and management standards have resulted in the difficulty of managing the information of agricultural products circulation, serious problems related to the quality and safety of products, high rate of cargo damage, the obstruction to the new mode of e-commerce and other issues, a major bottleneck in the quick flow of agricultural products. On the one hand, during the circulation of agricultural products, a large number of various types of information of agricultural products circulation will be produced which requires accurate recording. The relevant parties still adopt traditional means such as manual recording, single-machine storage, or printing. Hence, the workload for recording the circulation of agricultural products is very large. A large number of people, time and efforts are needed to collect and process the data. There are inevitably sporadic errors in the records, and to review these data are also time-consuming with certain difficulty. On the other hand, since that the circulation of agricultural products is continuous and planned and the work time of relevant personnel is uncertain, the final electronic information files will be delayed, and the quality control department cannot detect the problems in the circulation of agricultural products. In this regard, the review and re-examination of the information of agricultural products circulation are just a matter of formalism; and it is difficult to solve the problems in agricultural products circulation. Meanwhile, with the rapid development of e-commerce, information technology, and logistics technology, and driven by the integrated circulation pattern and new mode of agricultural transactions such as e-commerce, futures, and auctions, to build the system of electronic records of information of agricultural products circulation which covers production, distribution and sales has become a necessity. Electronic records is an important development trend for the management of agricultural products circulation and an essential means to quickly and easily achieve the mass data processing and standardized management for agricultural products circulation, and to make the management decisions on agricultural products circulation in the era of big data.

**Advantages of Electronic Records of Agricultural Products Circulation**

Documents can only be read and used by dint of electronic equipment, and the information can be quickly processed and transferred by the electronic devices and shared regardless of time, space and distance. It has a more stringent requirement for the conditions of hardware and software, unlike the paper-based records in terms of storage conditions and environment. Electronic records enjoy incomparable advantages. Firstly, it is characterized by fast exchange speed of information and continuous real-time data collection and processing [2]. In cold chain monitoring system regarding the circulation of agricultural products, the changes of temperature of the cold chain monitoring system can be recorded in time and continuously, and time and temperature curves established, which is more accurate as compared with manual recording. It is beneficial to the temperature monitoring of agricultural products circulation and ensures the traceability of the storage quality of agricultural products circulation. Secondly, it ensures the traceability and authenticity of data. Computer-based replication and correspondence technology ensure that the data collected comply with that of the original machine or sub-system so as to avoid violation or non-standard recording or random alteration of records [3]. The relevant parties can conveniently and quickly look up the records of agricultural products circulation already recorded in the system according to the different levels of authorization. The data is provided for analyzing and reviewing so as to make possible the traceability of quality of agricultural products. Thirdly, it will facilitate the integration of information and decision making related to agricultural products circulation. Electronic records of agricultural products circulation, after processed by the electronic system, will serve as the basis for making the decision on control measure of agricultural products circulation. Fourthly, it will facilitate the process control of agricultural products circulation. Statistical process control is an important method of process control. With the use of mathematical statistics, the data of agricultural products circulation and services will be collected, collated and analyzed, and the status of the process of agricultural products circulation be further understood, predicted and monitored so as to control the
quality of agricultural products mainly for the prevention-oriented purposes. Fifthly, it is convenient for the storage, retrieval and use of the agricultural products circulation related data. The quantity of agricultural products circulation is large, so that the use of electronic records can save a lot of paper, file room space, human and material resources, and also make possible the use and retrieval of the information of electronic recording. Sixthly, it will improve the management efficiency of agricultural products circulation. The managers of agricultural products circulation organizations, no matter where he or she is, can observe the basic situations of the various stages of agricultural products circulation through the network authorization system in real time. It will facilitate the scientific management of decisions and improve the management efficiency of agricultural products circulation.

Management of Electronic Records of Agricultural Products Circulation

The management of electronic records of agricultural products circulation includes collection, maintenance and use of the circulated data, namely, the creation, modification, maintenance, transfer, transmit, access, filing, storage, retrieval and use of the electronic records of agricultural products circulation. In addition, the safety management of electronic records of agricultural products circulation is very important. The establishment, maintenance, and management are important parts of the safety management of the electronic records. Therefore, the management of electronic records of agricultural products circulation requires firstly the establishment of the basic data of electronic records. The proper basic data of electronic records of agricultural products circulation ensures the unity between the operation results of the electronic records and the status of agricultural products circulation. It serves as the basis for the recording to be triggered and transmitted accurately. Secondly, it requires the establishment of management regulation on electronic records. Feasible management measures should be adopted considering the advantages and disadvantages of the electronic data of agricultural products circulation as well as the weak link. It is required to specify the responsibilities of personnel of different titles and organizations, and set up the input and review authority for electronic recording- only the authorized parties are allowed to input and alter the electronic information of the agricultural products. Thirdly, it requires the establishment of the standards for electronic records of agricultural products circulation. The verification procedure for the installation, operation and performance of electronic system should ensure the authenticity, integrity, reliability and security of the information of electronic records of agricultural products circulation. Fourthly, it requires that agricultural producers, distributors, carriers and other related organizations and people shall take initiatives and take the collection, collation, analysis, inspection and filing of electronic information seriously.

Control measures of electronic records of agricultural products circulation

Content of Electronic Records of Circulation Information

The content of electronic records of circulation information includes the information of agricultural products, producers, dealers and carriers. The information of agricultural products should include the product name, variety, grade, size, quality, origin, basic information about the implementation of agricultural standards; the agricultural products which has the right to use the quality mark should be recorded with the corresponding mark and certifying authorities and other relevant information; packaging products should be recorded with barcode, two-dimensional code, etc.; and with information relation to the verification and trademark according to different conditions. The information of agricultural producers should record the basic information of the agricultural products; the basic information of producers should be recorded such as producer’s name, address and contact information; the information of agricultural production should be recorded, such as the use of pesticides, fertilizers, and additives to facilitate growth; the information related to harvest, commercialization, pre-cooling, and storage should be recorded, such as the picking methods, time,
rating, date of pre-cooling and storage methods. Dealers should record the information of producers; the basic information of dealers should be recorded, such as dealer’s name, address, and contact details; the information related to commercialization, storage, transportation, and other information should be recorded; the information of transaction should be recorded, such as price, quantity, trading methods, and order information. Carriers should record the basic information of the agricultural products; the basic information of dealers should be recorded, such as the carrier’s name, address, and contact details; the basic information of the carrier includes the vehicles, drivers, etc; the order information should be recorded, including the company name, address and contact information of the purchaser; the storage information should be recorded, such as temperature, humidity, and routing information.

**Generation of Electronic Records of Circulation Information**

Agricultural products circulation organizations should use a closed system for the creation, modification, access, filing, maintenance and management of electronic records. The relevant requirements should be established to ensure the authenticity, integrity and confidentiality. The closed system can automatically generate the electronic record log information, including the recording person, recording time, and what is done. The system operator needs to periodically validate the electronic records system to ensure the accuracy, authenticity, originality of the electronic records and have the ability to discern the invalid or altered information of agricultural products circulation. The modification of electronic records cannot cover the originally recorded information.

**Retrieval and Filing of Electronic Records of Circulation Information**

Electronic record system should generate accurate and complete copies of electronic records, including the form by which people can read. Electronic records are easy for retrieval, and the information may be in use at any time during the validated period. Electronic records need to be backed up regularly to ensure that the corresponding electronic records can be recovered in case of disasters. It is recommended that electronic records be stored in the database, but not in the form of data file. Agricultural products circulation organizations should set the storage time limit according to different links. Facilities for electronic records should be equipped with the intelligent UPS uninterruptible power supply to ensure that information can be stored in case of power failure.

**Safety and Protection of Electronic Records of Circulation Information**

People who develop, maintain, or use the electronic records system should have a relevant educational background and work experience to ensure the originality of electronic records and to prevent counterfeiting of electronic records. People who develop, maintain, or use the electronic records system should regularly check the function of hardware facilities to ensure the effectiveness of its function and the validity of source data input. The control of the system file of electronic records includes the distribution and control of documents use and control of documents alteration to ensure its traceability. The authorities to access the system are classified to ensure that only the people with authorities can enter the system, read and write, add, delete and conduct other operations according to the classification. In addition, the confidential information of agricultural products circulation is encrypted before stored so that the people with no authorities cannot access to it.

**Use of Electronic Records of Circulation Information**

The relevant parties to the circulation should provide the corresponding information of circulation according to where they are in the circulation. The circulation information providers should establish an information management system to facilitate the use of circulation information. The circulation information records are mainly used for agricultural products circulation related services. They can be used for other non-commercial purposes with the consent of the recorders. To consult or borrow the circulation information archives, the information providers should strictly implement the relevant
procedures for retrieval and borrowing. The parties related to the circulation information are encouraged to take relevant measures to achieve the sharing and use of circulation information.

**Conclusion**

Currently, the electronic records of agricultural products circulation have become a key to strengthening the management of agricultural products circulation, safeguarding the quality of agricultural products and improving circulation efficiency. The records are authentic, systematic and normative, which has become a basic for the management of the information by the circulation organizations. For the management of agricultural products circulation, only by making full use of electronic records system can one acquire the traceable, accurate, timely and true information of management, thus facilitating the editing, monitoring, sorting, preservation and use of the information during agricultural product circulation, and improving the efficiency of agricultural products circulation.

**References**

