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Chinese Herbal Medicine Warehouse Management and Control Integration System Design

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Abstract

Chinese herbal medicine is the quintessence of the Chinese nation. However, Chinese herbal medicine processing, warehousing, distribution mode is relatively backward. Lack of appropriate industry standards, cause its quality and safety is a great hidden danger. The development of Chinese herbal medicine logistics is also in urgent need to follow the pace of the times, to meet the growing needs of the people. Storage is a very important part of the Chinese herbal medicine, a reasonable and appropriate storage can make the value and efficacy of medicinal materials are well preserved. Information management system, equipment automatic control system and operation safety monitoring system integrated storage management and control integrated system, Based on shared information, the storage efficiency of Chinese medicinal materials is improved, and it provides the basis for the information tracing system of Chinese herbal medicine.

Key words: Chinese herbal medicine logistics; Storage system; Warehouse management and control integrated system

1. Introduction

Chinese herbal medicine is the quintessence of the Chinese nation, but for a long time, Chinese herbal medicine has not been out of the mode of produce and sale of agricultural products, processing, warehousing, distribution mode is relatively backward, lack of corresponding industry standards, resulting in the quality and safety, there are great risks, and unreasonable treatment leads to the waste of medicine, cause certain harm to the environment and resources.

At present, Chinese herbal medicine planting basic to the family as a unit, yet scale and industrialization, medicinal materials drying, packing, storage, transportation and transaction settlement were not corresponding norms. Almost all of the Chinese herbal medicine market is basically the original backward farmers market trading market[1].Lack of standards, regulatory systems, quality inspection and traceability system, making it difficult to guarantee the quality of medicinal herbs. Circulation process, the Chinese herbal medicine information is not perfect, the quality of the problem can not find the cause of the source, tracing back to the source. The improper use of such as sulfur fumigation or aluminum phosphate fumigation, will cause the inherent quality of the drug changes, and even make the drug into poison.

Storage is important link of the logistics system, is a connecting link between the links of production, transportation, processing and consumption, warehousing system bear storage, storage, processing, integration classification, transport and so on many kinds of functions, and can through the buffer, regulating (supply and demand, price, transportation, etc.) role in the creation of value.Warehouse management and control integration system is the warehouse management information system and the monitoring system for storage integration as a whole, in the full sharing of information based on, operations management, equipment automatic control and safety monitoring integrated management[2]. So if we can build the integrated system of storage and control of Chinese herbal medicine, then the construction and improvement of Chinese herbal medicine logistics system has a strong role in promoting.

2 .Chinese Herbal Medicine Logistics

2.1 The status quo of Chinese herbal medicine logistics

Chinese herbal medicine logistics is still in the initial development of modern logistics started, most Chinese herbal medicine can not achieve smooth flow of goods and its value. The Chinese herbal medicine logistics has origin processing of decentralized, not standardized; packaging specifications are not unified, no packaging, excessive packaging; stored in homes, a serious shortage of professional warehouse; warehouse rental no management, there is no information system; during the processing and storage use sulfur, aluminum phosphide, especially warehouse facilities and maintenance technology is very backward; storage set reduction, the degree of the scale is very low; no uniform industry logistics standards and industry regulatory problems [3]. Along with the

economic and social development, people's living standard is improved, the continuous expansion of the demand for health care, along with the growth of the usage of Chinese herbal medicine, traditional Chinese medicine logistics has been unable to meet the pharmaceutical industry's development and people's health needs. China is urgent need to establish a modern logistics system.

Chinese herbal medicine logistics market potential and development prospects are very broad, Chinese herbal medicine of modern logistics development environment is forming and development of logistics infrastructure and equipment issued by the scale, gradually improve the logistics system of Chinese medicinal materials, forming a from the production, purchase, distribution processing, transportation, storage, handling, packaging, distribution and sales to a set of organizational links, has also laid the necessary material foundation for medicine logistics[4]. At the same time, the development of modern information technology, traditional Chinese medicine, the development of storage and storage and management mode of the traditional Chinese medicine has laid a good technical foundation for the development of modern logistics system.

2.2 The characteristics of Chinese herbal medicine logistics

1. Chinese herbal medicine logistics is the production of decentralized, variety, batch, batch of lean logistics.
2. Chinese herbal medicine logistics from the origin of the beginning of processing, the logistics process is long, the procedure is more complex.
3. A wide range of sources of Chinese herbal medicine, plants, animals, minerals and other, prone to mildew, moth eaten, fade, loss of taste and affecting the efficacy of the problems, of different medicines on the preservation of the environment have different requirements.
4. Chinese herbal medicine logistics need to have quality inspection, record and tracing function.

2.3 Problems in the logistics of Chinese medicinal materials

1. Storage facilities are backward, most of Chinese medicinal materials stored in farmers and individual business houses, keeping the poor conditions.
2. Traditional Chinese medicine processing and packaging technology is backward, the inconvenience is stored in the information management, waste and pollution is serious.
3. Chinese herbal medicine logistics intensive, large-scale degree is low, the operation is scattered, concentration is not enough.
4. Storage and maintenance technology behind, in violation of Chinese herbal medicine only sulfur and aluminum phosphate fumigation phenomenon is more common, it is difficult to guarantee the quality of medicinal materials, and the pollution of the environment is more serious.
5. Chinese herbal medicine logistics standard system is not perfect, the industry management is not in place, the circulation efficiency is low, the market is not stable.
6. Chinese herbal medicine production and sale of counterfeit goods serious, adulteration , has seriously affected the efficacy of Chinese herbal medicine and people's life and health [5].

3 .Warehousing Management and Control Integration System

3.1 Overview of storage management and control integration system

3.1.1 Storage management and control integration system function

Warehouse management and control integration system is a warehouse management information system and the monitoring system for storage integration as a whole, in the full sharing of information on the basis, to achieve integrated management of operation management, equipment automatic control and safety monitoring. It includes three subsystems, namely, warehousing operations and information management system, storage equipment automatic control system and storage running safety monitoring system, as shown in Figure 1:

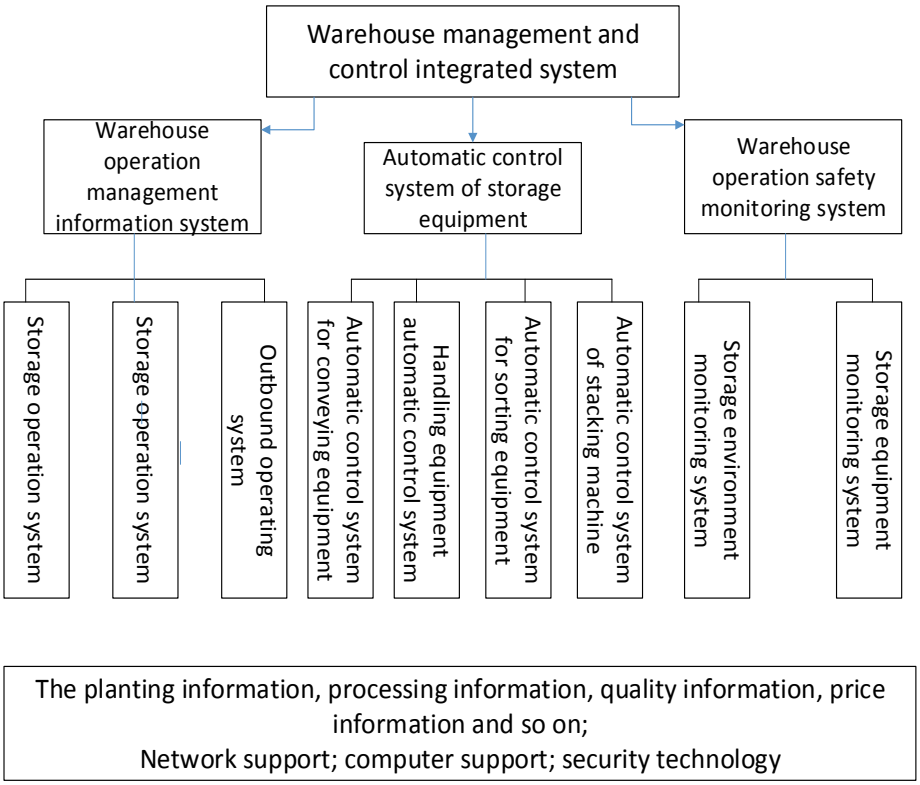

Fig. 1 integrated storage management and control system

1. Warehouse operation management information system

Warehouse management information system of warehouse operation process of storage of goods varieties, quantity, time, frequency database in balance and other data are detailed records, and effective control of each work link with these information, through the analysis of these information processing, formulate reasonable operation strategy, so as to ensure the necessary inventory levels as well as the warehouse the goods movement, ensure the purchase, order picking and shipping operation link unblocked.

2. Warehouse operation safety monitoring system

Storage operation safety monitoring system usually includes two parts: storage environment monitoring and storage equipment monitoring. Warehousing environmental monitoring is to use all kinds of advanced ell as the warehouse the goods movement, ensure the purchase, order picking and shipping operation link unblocked.

3. Automatic control system of storage equipment

Storage equipment automatic control system can be regarded as warehousing machinery and equipment, information collection and information recognition device, execution equipment and computer control equipment, and other organic integration, from the perspective of control equipment, storage equipment automatic control system according to the categories can be divided into conveying equipment automatic control system, handlin means of monitoring to ensure the parameters of warehousing environmental conditions, such as temperature, humidity, illumination and so on real-time measurement, recording, calculating, alarm, etc., in order to achieve the supervising and control of warehouse operation environment and for the future to improve warehouse operation environment protective gear for historical analysis. Storage equipment monitoring is the use of advanced monitoring equipment and technical means for the implementation of real-time monitoring and security of key operating equipment, the purpose is to ensure the safety and efficiency of warehousing operations [6].

3.1.2 The realization of the principle

From the point of view of technology, the integrated system of storage and management is composed of physical layer, network layer and application layer three layer structure, as shown in figure 2:

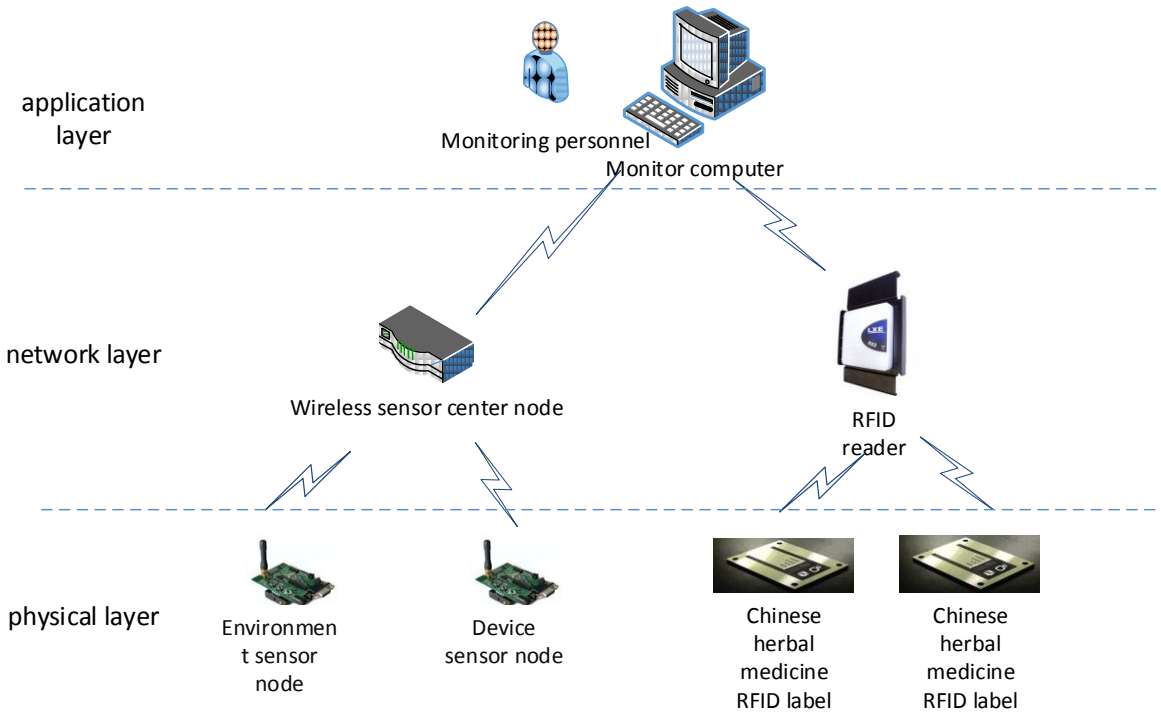

Fig. 2 Warehouse management and control integrated system 2 layer structure

3.2 The advantages of the integrated storage management and control system

Modern logistics and the need to vigorously develop based on information technology and automation equipment of logistics management and control system, and storage as the important link of the logistics is urgently needed to achieve a high level of management and control integration, namely in the full sharing of information based on, originally operated independently of the management information system and storage equipment automatic control system integration as one of the integrated management, and enhance the logistics operation efficiency and security of the system. Compared with the traditional warehouse management system, warehouse management and control system has several advantages:

1. Set multi-function in one

The operation of the storage system needs to complete a series of activities, the implementation of these activities can not be separated from all kinds of operating equipment for storage operation information collection, processing, transmission, storage, and even information processing. Traditional warehouse management information system will be able to accomplish these tasks the basic, if the equipment automatic control system and operation safety monitoring system and management information system integration for a system, then to the storage of information collection, transmission and processing will has become more comprehensive, more reliable and more efficient. The whole system has a high real-time requirement for storage information, so the real-time and reliability of the network also have higher requirements.

In the system, it can solve the contradiction between the small information transmission delay and the large amount of data transmission. Such as the use of RFID and wireless sensor network is the combination of sensor nodes can be measured items RFID tags recorded items of information, and measuring the storage environment temperature, humidity and other parameters or parameters of mechanical equipment vibration, so an integrated sensor nodes received different types of data, and a certain amount of processing, through network transmission to the computer on, can greatly reduce the workload of the computer, improve work efficiency.

2. The diversity of sensor types

Whether it is the information of the goods, or the storage of environmental parameters, or the parameters of the operation of the device state, are required to obtain the information of the sensor. Physical, chemical, biological, and so on a variety of sensors, measurement precision, accuracy, sensitivity, applicable to the environment are not the same. Therefore, it is necessary in the analysis based on the specific situation and the needs of different selection of different sensors, can achieve precise measurement and reduce the cost of.

3. Management simplification

The system has a friendly user interface and good system maintenance function. It is a multi - user system in the network environment, and has the function of multi - level authority setting and management. As long as the user

through a simple operation can be based on a full range of information to effectively regulate and control the storage equipment, change the warehouse temperature, humidity, light intensity and so on.

4. The application service oriented information processing

Due to the limitation of the integrated sensor nodes compute and storage capacity, the physical location, information identification and acquisition, data pretreatment and overrun alarm for primary information processing to multifunctional nodes complete, and will have a deal with the related information of warehousing operations and equipment control, safety monitoring, information fusion to the monitoring and information processing center. In this way, not only can save time, can also improve the overall reliability of the storage management.

Information utilized in order to scientific decision-making, so the system of comprehensive information and processing is service oriented and service to different applications with the corresponding information processing mode and method, according to the different needs of different applications, in information perception, transmission and the synthesis and application of the process may need to processing, storage and use of information and system information processing functions of different layer has been carried out.

Warehouse management and control integration system with advantages of simple management, real-time information, multi-function, service oriented, collecting data, accurate etc., to accelerate the pace of warehouse management system can only and enterprise logistics informatization , automation.

4. Chinese Herbal Medicine Warehouse Management and Control Integrated System

4.1 Warehouse operation management information system

4.1.1 Chinese herbal medicine warehousing operations process and information

1. Input work

Input work includes receiving, inspection and storage of three parts [7].

Chinese herbal medicines from suppliers shipped to warehouse, warehouse management staff should receive to to carry on the contact communication and coordination with the consignor, carrier unit, information about Chinese herbal medicine quantity, type, weight and volume, and the arrival of the goods at the time and the way of information; then management personnel arrangement receiving time, place, receiving personnel, receiving equipment; consignment for receiving procedures, financial procedures.

Quality acceptance inspection personnel need to view the Chinese medicinal materials, determine whether to receive; receiving the goods, need to use RFID reader to record information (name, medicinal herbs planting area, block, termination time, fertilizers and fertilizer, pesticides and pesticide is quantity, soil type, planting, harvesting time the user name and telephone number), information processing (production processing enterprises, processing time, quantity, specifications, grade, moisture, pesticide detection, packaging, packaging specifications), the medicine quality information (medicinal grade, quality requirements of preservation conditions and prone to problems,) and price information of the electronic label read into the computer at the same time, the inspection personnel, inspection information, receiving time to write to the electronic tag in [8].

After the completion of the acceptance, the Chinese herbal medicine ready to put in storage, the need for computer allocation of Library bits, and put in storage time, library bit information written to the electronic tag. And the establishment of the computer inventory records, inventory bills, etc. The information flow of the storage operation is shown in Figure 3.

2. Storage stage

The most important task of the storage stage is to keep the medicine. Different Chinese herbal medicine on the preservation of the environment has different requirements, and some need a certain humidity, and some need to dry the environment, and some need to have a high temperature and some low temperature storage. So in understanding different herbs to the requirements of environmental conditions, using ABC classification, herbs according to the storage environment, value, use frequency of storage and so on. After considering the storage of reasonable arrangement of to ensure custody in suitable condition for just the right the right medicine. And through more advanced technology such as air conditioning technology to maintain the medicinal herbs, so that the quality and value of Chinese herbal medicine in the process of storage will not be lost.

When the medicinal material is stored in the right shelf, the information of the goods shelf is required to be written on the RFID label of the medicinal materials, and the information is recorded on the computer. Then the medicine inventory and need medicine quantity and medicinal materials inventory time, to guide the day-to-day operations of the business; also need to look at the gains and losses to see if there is a change the quality of medicinal materials, if there is a change to the timely processing, the losses to a minimum. Each count should be recorded in the computer, including time, inventory, quality of the information.

3. Delivery of cargo from storage

Before the delivery of the need for sorting, sorting finished the medicinal herbs but also a quality inspection, substandard materials in addition to processing; qualified medicinal materials for packaging, handling, handling the financial transfer and other procedures. At this time the need to take the time, the

library location, quality inspection results, the information of the library staff to write the RFID tags in the computer at the same time recorded in the computer.

4.1.2 Warehousing operations process design

Reasonable process design can greatly improve the efficiency of warehouse operations, the effective use of the warehouse, reduce the cost. Therefore, this paper designed the information does not interrupt the warehousing operations, and lay the foundation for the quality and storage of medicinal herbs. The operation flow and information flow are shown in figure 3:

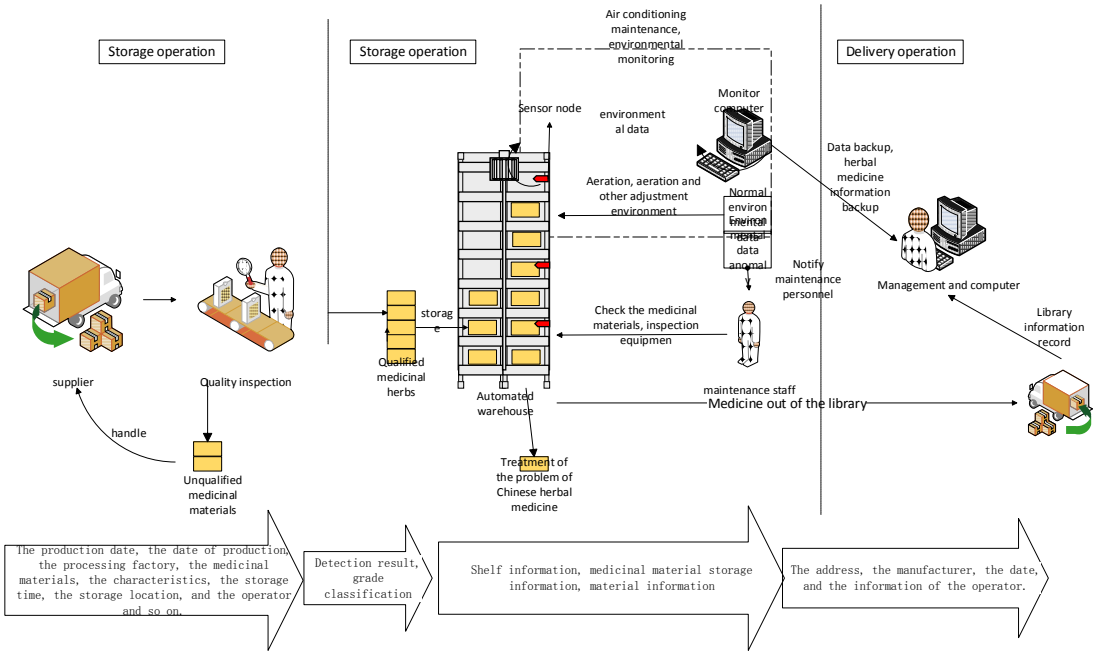

Fig. 3 Operation flow and information flow diagram

4.2 Automatic control system of storage equipment

Warehouse equipment includes shelves, stacking machine, van, out of storage and conveying equipment, sorting equipment, hoist, automatic guided vehicle and robot handling etc., through the automatic control system to control the equipment, can improve the efficiency in the use of equipment, reduce the labor intensity of the workers.

In the warehouse management information system based on, Chinese herbal medicine storage storage information stored in the storage system of the computer database system, according to the procedure of Chinese herbal medicine, the use of computer automatic control system to control the storage equipment to make it better with warehousing operations of.

Storage, after determining the storage location of Chinese herbal medicines, computer control storage conveying equipment put the medicine into the specified location; sorting sorting information processed by computer into instruction, control sorting equipment operation, crude drugs need to be ready; and information through a computer, let automatic guided vans or is handling robot to the sorting good medicinal materials transported to the unloading area, waiting for the library.

4.3 Warehouse operation safety monitoring system

The storage operation safety monitoring system includes two parts: the storage operation equipment monitoring system and the storage environment monitoring system.

4.3.1 Storage equipment monitoring system

Storage equipment, especially the transmission and sorting equipment directly affect the normal operation of the security and efficiency of the warehouse. In the storehouses of medicinal materials in the integration of management and control system, storage equipment modernization, automation degree is more and more high, structure more and more complicated, from research, design, production to scrap all aspects of interdependence, mutual restriction and because of energy intensive equipment, the majority of energy consumption, investment and the use of very expensive, so storage equipment is the main means to improve the efficiency of warehousing system, is a reflection of the main signs of the storage system level, but also in building a major cost factors of storage system. So it is very important to monitor the storage equipment effectively and effectively.

Storage equipment monitoring system is divided into three layers, data acquisition layer, data transmission layer and data processing layer. Acquisition layer consists of sensor nodes constitute a sensor network, the running state of the equipment acquisition parameters, such as vibration, displacement, acceleration, etc.; data transmission layer is all limited network or wireless network consisting, can guarantee the data safe and accurate transmission; data processing layer of the machine, through the computer on the data of real-time display, record and analysis, and then
processed , error alarm and notify the maintenance personnel and record abnormal condition [9].

4.3.2 Warehousing environmental monitoring system

For the storage of Chinese medicinal materials, the environment is an important factor affecting the quality of medicinal materials, temperature, humidity, air is oxygen content will be affected the medicinal quality. If the control is not good, the drug problem of mildew, bug eat by moth, color, flavor and so on, serious may also make the medicine lose resistance even as a poison. The use of air conditioning technology is to regulate the content of various gas components in the storage environment, so that the medicinal herbs in the environment of low oxygen, reduce the frequency of problems and opportunities.

The storage environment monitoring system is also divided into three layers, data acquisition layer, data transmission layer and data processing layer. Data acquisition layer through the sensor nodes to detect environmental temperature, moisture and oxygen content and other parameters, the transport layer is sent to the data processing layer and data processing layer of computer for real-time monitoring data for display, storage and processing and keep these parameters in certain range change [10].

The computer of the data processing layer can control the regulating valve of the storage system, so as to keep the environment parameter of the medicinal material in a stable range. If the temperature becomes low on heating, temperature rise of cooling; if too much moisture and dry, humidity is too low humidification; oxygen content is too high, charge some nitrogen and so on.

5. Conclusion

In the analysis and understanding of the Chinese herbal medicine logistics, this paper designs a Chinese herbal medicine storage management and control integrated system. Warehouse information management system in the system can preserve the details of the Chinese herbal medicine, and the management layer can use this information to the warehouse operation of certain guidance; storage equipment automatic control system will be able to use computer control equipment to carry out the operation, reduce the labor intensity of the workers, but also greatly enhance the work efficiency and use efficiency of the device; warehousing operation safety monitoring system can monitoring medicine storage environment data, ensure the storage quality herbs, and storage equipment monitoring, so that the safe and stable operation of equipment.

In medicine warehouse management and control integration system with system thinking, from the overall interests and the overall function focus, the function of each subsystem integration together, through the information feedback, the system to be in a state of self-adjustment, to maintain a stable.

Chinese herbal medicine through a good storage, can greatly improve the quality of the preservation of Chinese medicinal materials, reduce the waste of materials and cost loss, reduce the pollution of the environment and the harm to the human body. And through the information system, in the quality of medicinal materials, can get the query and traceability, so that consumers can use more at ease and rest assured. Chinese herbal medicine warehouse management and control integration system is a part of the modernization of Chinese herbal medicine system, providing warehousing and information security for the logistics of Chinese herbal medicine.

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