Scholar Publishing Group
International Journal of Engineering Technology and Construction
https://doi.org/10.38007/IJETC.2021.020101
ISSN 2789-7176 Vol. 2, Issue 1: 1-15

Design and Implementation of Electric Automatic Cow Feeding Management System

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Keywords: Electrical Automation Technology, Dairy Farming, Automated Management Technology, RFID Technology

Abstract: Milk is a kind of high nutritional energy supplement food, which is suitable for all ages and plays an important strategic role in improving the physical quality of Chinese people. However, China's dairy industry is relatively backward; both per capita intake and per unit yield of dairy cattle are at the international low level, the main reason is still the backward dairy management system. At present, the research in this field at home and abroad is mainly based on sensor technology and neural network, but there are various deficiencies. In order to solve this problem, this paper proposes a cow feeding management system based on electrical automation. RFID technology is one of the core technologies of the management system in this paper. It can collect the information of dairy cows in real time by setting electronic tags. The electric automation cow feeding management system is based on the n-layer C / s system structure under the framework of. Net. SQL Server 2005 is used as the background database. The system in this paper basically realizes real-time monitoring, intelligent reminder, and sets up a functional module management system. The system covers the whole process from rising to selling, and has strong source tracing function. Finally, in the specific test comparison, through the test data, we can see that the electric automatic cow feeding management system in this paper has greater advantages than the traditional method. In particular, the milk production of dairy cows has been greatly improved, and it is obviously helpful for the recovery of the body of dairy cows. The experiment shows that the management system of this paper can be used to manage dairy cows scientifically and effectively.

1. Introduction

Milk is called the complete food with balanced nutrition. It contains protein, calcium, fat, sugar, potassium, phosphorus, iron, vitamins and other nutrients. It can provide all the necessary amino

acids for human body. Milk is rich in protein and easy to be absorbed by human body, so it can replace a mother's milk nurse with a baby. Promoting the healthy growth of children and adolescents can also prevent diseases. The elderly can also prevent osteoporosis and prolong life. Therefore, milk is known as "white blood" by nutrition experts and cows are regarded as "human nannies". On the whole, China's dairy industry is still in the state of "small, loose and low "Small" refers to the small scale of dairy farming. In 2001, the scale of dairy farming in China was 6.753 million, with an average scale of about 4.5. "Free range" means that cows are raised in tens of thousands of families in China, of which more than 93% are raised by individuals. They are very scattered, and the cost of production, collection, storage and transportation of milk is relatively high. "Low" refers to the low level of production and low degree of industrialization. The average output of China's adult cows is more than 3100 kg, while that of the United States, Israel and other countries is more than 8600 kg, and that of Sweden, Denmark, France, Japan and other countries is more than 6600 kg. In 2005, China's per capita milk consumption was only 17.3kg, less than 1 / 6 of the world average, less than 1 / 3 of the Asian average. In addition, the production technology of dairy industry is backward, and the national mechanical milking rate is less than 25%.

There are many factors affecting the yield and quality of dairy cattle, which can be summarized as genetic varieties, individual differences, physiological age, gestational age, lactation, lactation, dry lactation, health status and feeding environment. In order to realize the transformation from traditional production management to modern management and improve the yield and quality of dairy cattle, it is necessary to have a detailed understanding of the overall situation of dairy cattle. The traditional method of cow breeding relies on people to check the health status of cows, which is very simple, but has the following disadvantages: first, the accuracy is low, there is no scientific and reasonable method to accurately detect the health status of cows. Secondly, the real-time is not high, managers cannot get the latest health status of dairy cows in time, which may delay the treatment of dairy cattle diseases, resulting in greater economic losses. At last, there is a large amount of work, and a large number of personnel are needed to monitor the cows. The key technology of cow automation management is to collect the information of cows through various advanced electronic equipment, and then analyze it with computer software to obtain various relevant data of cows, so as to provide various feeding suggestions for the cow breeders. The system is mainly composed of cow information collection equipment and cow information analysis software group Yes. At present, there are many researches on cow feeding management system, such as sensor based management system, neural network based management system, etc., but these systems have low accuracy and efficiency. In order to solve this problem, this paper proposes an innovative cow feeding management system based on electrical automation technology.

The electric automation management scheme in this paper is based on the existing traditional technology, combined with the electric automation technology. First of all, this paper introduces and analyzes the related concepts and theoretical basis in detail, and thinks that the main reason for the backwardness of China's existing dairy industry is the backwardness of technology. In view of this situation, this paper introduces the electric automatic cow feeding management system in detail. The system in this paper is mainly divided into two parts: information recognition and system implementation. RFID technology is used in information recognition, which is widely used in the automatic breeding of animal husbandry. It is mature and has obvious advantages. In the aspect of management system setting, this paper mainly designs six modules including production management, disease management, etc., covering the whole process from production to sales of dairy cattle, and fully realizes the purpose of automatic management. In order to verify the effect of this system, the practical effect of traditional method and this method is compared. Through the comparison of milk production between the full lactation and the late lactation, the data shows that

the method in this paper has a greater improvement on milk production than the traditional way. The management system of this paper has basically reached the international standard level, and has a breakthrough improvement for the traditional way. It is believed that under the wide application of this system, it will be able to better improve the backward situation of China's dairy feeding technology [1-3].

2. Related Concepts and Theoretical Basis of This Paper

2.1. Dairy Farming

The main breed of Chinese cow is Holstein cow, which has strong environmental adaptability and is distributed in all provinces of China. It has the characteristics of high yield per unit area and low feeding requirements. At the same time, this kind of cow is a hybrid of pure Dutch cow and native cow.

(1) Characteristics of dairy farming

At present, China's dairy farming industry shows a trend of scale and concentration, while the total output of China's dairy cows shows a downward trend, which may be caused by the occurrence of diseases, the imperfect mechanism of milk price, the rise of breeding costs and other factors. So far, China's dairy industry as a whole lags far behind the developed countries in animal husbandry, lacks international competitiveness and relies heavily on imports from the Netherlands, New Zealand, Australia and other countries. If China does not optimize the use of resources, it is bound to increase China's dependence on other countries and delay the development of China's dairy industry. Therefore, the rational use of dairy related resources in various regions plays an important role in the development of China's dairy industry.

(2) Influencing factors of dairy farming

The prosperity and development of dairy industry determines the development level and speed of China's dairy industry, but the dairy industry is in a weak position in the dairy industry chain, so the government should give strong policy support. On the one hand, we should vigorously support large-scale and standardized farms, improve the technical capacity of breeding, and reduce the cost of milk production. On the other hand, it is necessary to improve the relevant plans of dairy industry in various regions, especially the guiding ideology of the 13th five year plan, and implement macro-control. China's booming dairy industry benefits from the state's subsidies for high-quality varieties and farmers' use of high-quality rust removal feed, which greatly improves the per unit yield of dairy cows in China. In particular, it is necessary to highlight the combination of agriculture and animal husbandry, agriculture and animal husbandry, and plan the scale of livestock and poultry feed. The circular ecological mode of combination of agriculture and animal husbandry and breeding can protect the environment and improve the efficiency of cow breeding [4-6].

2.2. Current Situation of Dairy Industry in China

Since 2000, the growth of various indicators in the dairy industry has exceeded the double-digit for several consecutive years, and the production, processing and consumption of raw milk have achieved rapid growth at the same time. It plays an important role in the development of the rural economy, the concentration of farmers, and the improvement of the dietary supply of urban and rural residents. With the rapid development of China's dairy industry, there are also a series of new situations and problems: for example, with the sharp rise of feed prices, the benefits of cattle farmers decline; low per unit yield, short service life and other issues affecting the economic

benefits of dairy farmers are more prominent. At the same time, the market pressure urges dairy enterprises to raise the threshold of milk purchase, while small and medium-sized dairy farmers lack the awareness and technology to ensure the quality and safety of milk; some local production and marketing links are not balanced, resulting in the phenomenon of restricting the collection of milk sources and defaulting on the funds of farmers' milk sources. The reasons for these phenomena are that the overall technical level of dairy farming in China is backward, the production organization is insufficient, the rate of science and technology entering the household is low, and the quality awareness and health and safety awareness of dairy farmers are weak [7-8].

2.3. Backward Management of Dairy Cattle

At present, China's dairy cows are mainly raised in rural areas, and more than 95% of the dairy cattle are raised by farmers. Because of their low cultural quality, the breeding and management methods are backward and the incidence rate is high.

First of all, dairy products are high-tech, high investment and high market risk industries. Dairy cattle are the most technologically advanced livestock with the most complex physiological phenomena and behaviors, nutrition, environment, and various feeding management requirements. This requires that employees have a high level of education and learning ability, and can use various technologies, but on the contrary, although Chinese farmers have thousands of years of cattle tradition, cow farming is only a few decades of history. Generally, as beef cattle feed, dairy cattle are mainly those that are not in accordance with the laws of physics due to extensive breeding and management. There are not enough feed and drinking water for dairy cows, which are lack of nutrition. Some of the milk output is low, and the production potential cannot be realized. Some cows are not reasonable in their nutrition collocation, or more or less, more or less coarse, unbalanced nutrition, and low digestibility of feed, resulting in huge waste of raw materials. Incidence rate of cows is high, and nutrition metabolism diseases, foot diseases and reproductive system diseases frequently occur, up to 35% [9-11].

Secondly, due to the limited conditions, the vast majority of scattered farmers did not implement strict health measures, resulting in poor health conditions, human and animal interference pollution. The incidence of mastitis is low, and the incidence of mastitis is 15% to 25%. The incidence rate of brucellosis and tuberculosis incidence rate is over 3% in some areas, which seriously affects the economic benefits of dairy farming. Such low-level farmers cannot stand the test of the market, once they encounter market fluctuations, they may be eliminated.

Then, due to the development of rural economy, especially the limitation of farmers' own capital accumulation ability. The vast majorities of farmers do not have the ability to buy a lot of cattle, do not form a large-scale breeding, cannot build a better shelter, cannot afford mechanical milking machine, Luo feeding management, improvement plan. It is difficult to realize the comprehensive technology promotion and social service of raising dairy cows, so it is also difficult to improve production capacity.

2.4. An Overview of Electrical Automation Equipment Management System

In short, electronic automation equipment management system can be considered as a computer technology, communication technology, management as one of the systems. It can provide a variety of information for the electrical automation equipment management personnel, and the management personnel can make correct decisions based on the information. The following three aspects are analyzed from the electrical automation equipment, electrical automation technology, and electrical

automation equipment management system [12-13].

(1) Electrical automation equipment.

With the rapid development of science and technology, electrical automation equipment has been widely used in various fields, such as switches, aircraft electrical automation equipment. To some extent, as long as it is related to electrical automation engineering system or computer technology, power electronics technology, information processing technology, automatic control technology and other products, it can be called electrical automation equipment.

(2) Electrical automation technology.

Gradually rising with the development of electronic information science, a discipline called "electrical automation technology", electrical automation technology can be called industrial electrical automation. There are many contacts between electric automation technology and people's daily life. Although the electric automation technology in our country started late, with the rapid development of social economy, the electric automation technology develops rapidly, and its position in the national economy is higher and higher.

(3) Equipment management information system.

As for the equipment management information system, it is actually a system integrating the computer technology, communication technology, management technology and information service for the equipment management and auxiliary management. The equipment management information system has the characteristics of wide range and high degree of integration. In order to ensure the normal operation of the equipment management information system, the affected equipment management information system must be designed with good security and ease of use, but also with high integrated equipment management information system.

3. Management System Design

3.1. Technical Scheme of Cow Identification

RFID technology, namely radio frequency identification technology, belongs to an automatic identification technology, which is a new technology integrating large-scale integrated circuit, data communication and transmission technology and antenna technology. At present, RFID technology has been widely used in access control system, material source tracking, anti-counterfeiting, transportation and other fields, with strong item identification ability, and information is not easy to be copied and tampered with. Rffid technology is essentially a wireless communication means, which writes data in RFID tags and attaches it to the target to be identified. RFID reader can identify different targets by reading the data in the tag. The electric cow automatic feeding management system studied in this paper is mainly the collection and management of data flow, which needs to identify different individual cows accurately. This topic is applicable to the application of RFID technology. RFID tags can be added to the ears of cattle. Readers can identify different cattle by reading tag data [14-15]. The general work flow is as follows: the reader sends a certain frequency of RF signal to the electronic tag, drives the IC circuit of the tag, transmits the data by the tag and the reader, and finally the reader sends the collected information to the data management system.

(1) Electronic label

It can be divided into passive type, semi passive type and interactive type. Passive tag is the mainstream of RFID tag market. Passive tag has no internal power supply, and is driven by reader

to read and write data through tag antenna driven by electromagnetic wave. The antenna has two main functions: one is to receive the electromagnetic wave of the reader and drive the tag circuit; the other is to transmit the reverse signal through the impedance of the antenna. The semi passive tag uses integrated circuit and small battery to drive the tag. The antenna is responsible for sending the signal back to the reader. It is faster and more effective than the passive tag. Active label is responsible for internal power supply. Compared with the former two, it has a longer running distance and larger label memory capacity.

(2) Reader:

It is usually composed of antenna coupling module, data transmission module, interface module and control module. Reader is the information control box processing center of RFID system. It communicates with tag in half duplex way. It also provides energy and timing for passive tags.

(3) Data management system:

It mainly refers to the reader and user software system connected to the upper computer. The electric cow automatic management system studied in this paper is a typical RFID system. It mainly includes PC and database management system as middleware, embedded terminal equipment as reader, cow ear tag as electronic tag.

3.2. Chip Selection

(1) Selection of embedded terminal equipment

Through the above demand analysis, Samsung s3c2440a processor is adopted, which adopts ARM920T core, low power consumption, rich interface, powerful function, stable operation under 400MHz clock frequency, suitable for small terminal equipment design.

(2) RF chip selection

Fm1702sl chip is used for RFID cow's personal identification. It is a contactless card reader chip based on iso14443 type a protocol. It is characterized by highly integrated analog circuit, support distance up to 10cm, support SPI interface mode, high data security, software programming control.

3.3. System Database

According to the demand analysis of the digital production management system of dairy cattle, the database of the system adopts the current popular and practical relational database. Through the optimization design of the data structure, the data redundancy of the system data table is greatly reduced. For example, the previous design of breeding database is to build a table according to each breeding stage, and now it is integrated into the same breeding data table, so the system database can achieve the functions of data retrieval, sorting, increase and decrease, change, etc. According to the analysis of management knowledge of large-scale dairy farm, the system has designed a total of 24 data tables, which are connected with the problems of data tables through logical relations, forming a comprehensive database based on cow information database, and five databases of dairy farm management, feeding management, lactation management, health management and operation management. The overall structure is shown in Figure 1.

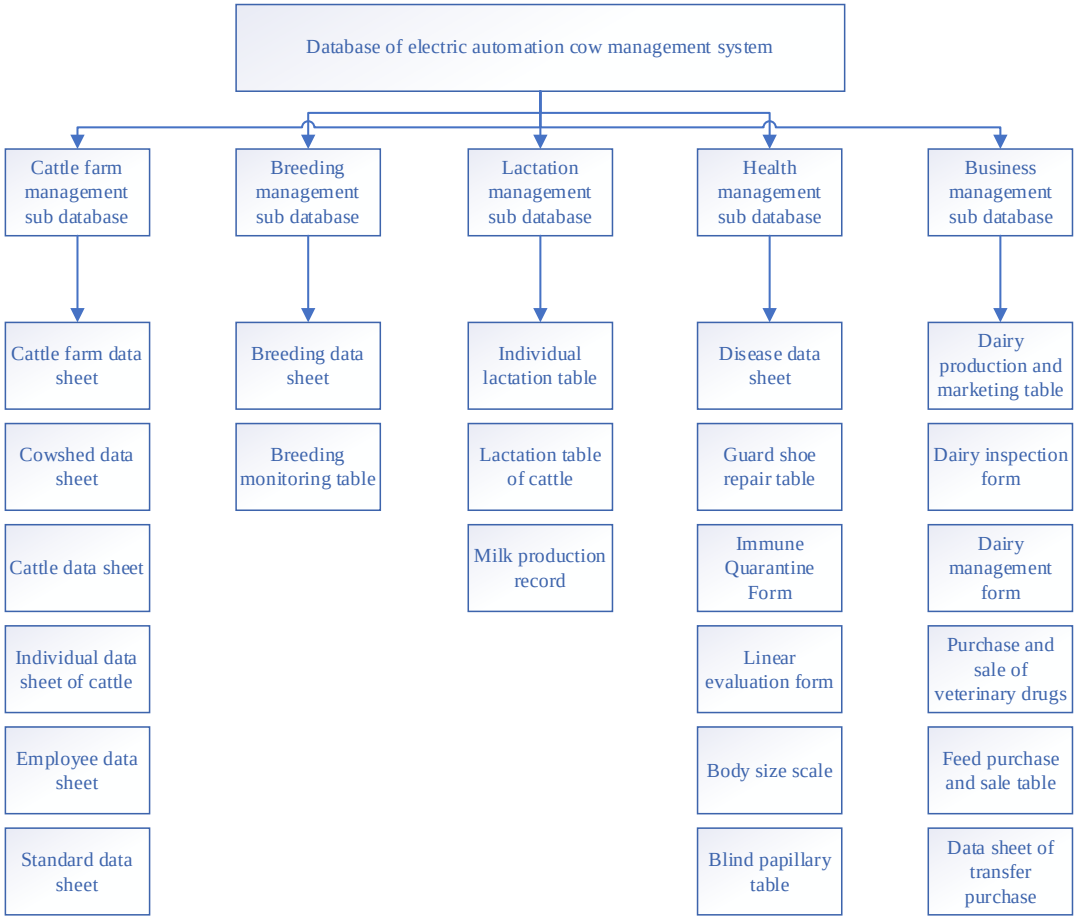

Figure 1. Overall structure of system database

3.4. Realization of the Main Function Modules of the System

Based on the C / S architecture of cow automatic feeding management system, net framework according to the actual needs and technical requirements, the system uses Microsoft Visual Studio, net 2005 as the front development language, SQL Server 2005 as the back database. The implementation of the structured development strategy and the object-oriented idea fully realizes the real-time monitoring, intelligent reminder, high module integrity and strong interface of the dairy production management process. The system is mainly composed of six main function modules. The system adopts the form of menu management. Users need to verify in the login interface before entering the main menu. In order to facilitate operation, the system sets common functions as shortcut keys under the main menu.

3.5. Module Function Introduction

(1) Cattle farm management module

This module realizes information management, personnel management, cattle farm elimination and departure management, cattle farm list, cattle farm data information import. All data operations can be carried out in this module. The newly introduced cattle can be recorded in the system only by recording in this record. The basic information filled in is the basis for the system to prompt cattle production management information in the future.

(2) Production management module

This module is mainly divided into seven sub modules, which will be introduced one by one.

1) Breeding management

The system has an event focus column for breeding process. After logging in the system every day, the system updates the aquaculture work to be completed on that day to white, and prompts with red font to realize the real-time monitoring and reminding function of aquaculture tasks. Reminder items include first estrus reminder, post natal estrus reminder, suitable cow reminder, pregnancy test reminder, recheck reminder, pre delivery reminder, milk powder reminder, weaning reminder, etc. the first button in each tab is linked to cow breeding card, where breeding activities are implemented.

2) Lactation management

This module is an important module, mainly for daily lactation management. In addition, the system can draw the lactation curve of a single lactation data management point in a certain birth order, and provide the export of these data in the form of Excel.

3) Disease diagnosis and treatment

According to the original design goal, the disease diagnosis and treatment sub module can assist the diagnosis and treatment of common cow diseases. The symptom user can double-click the left column, the corresponding item button and then click the diagnosis. The system will list the disease names from high to low probability according to the listed credit. The user can click again, continue to select the treatment of symptoms or click the system reliability to give the highest disease treatment, so as to complete the auxiliary diagnosis and treatment process of a disease. In addition, the processing results can also be output to excel format.

4) Disease management

This module is used as the disease management, disease discovery and recommended treatment plan of dairy cattle. Based on this, users can choose any time to query the disease and treatment situation of dairy farms in this time period. In addition, the system can also generate bar charts for incidence rate at a time for managers to refer to.

5) Protecting and repairing hooves

This module is mainly used to manage the cow's feet and hooves. When inputting, you only need to check the corresponding check box in the shoes protection and repair area to complete the operation. It simplifies the input process and reduces the workload. This module supports the query of horse shoe protection and repair records at any time.

6) Management of blind nipple

In this module, users can record and query the tongue nipple, and the input process is similar to the protection and repair module of shoes.

7) Body weight sub module

In this module, users can record and modify the basic body shape of cattle.

(3) Dairy management module

The module realizes fresh milk sales management, milk detection and milk production and sales statistics. Users can choose to query statistics by month, or at any time, to realize monthly report and annual report. According to the needs of the establishment of the corresponding analysis chart,

and each interface supports the export of data in Excel format.

(4) Feed management module

This module is mainly about the management of sales behavior, including product categories, channel providers and so on. Different from the dairy management module, the user can select the check box in the report interface to realize the feed and output statistics according to the feed type.

(5) Veterinary medicine management module

This module is used to manage the purchase and consumption of veterinary drugs, which is the same as the module to manage the incoming and outgoing materials.

(6) Statistical analysis module

According to the needs of users, the module data can be exported, and each sub module can carry out data analysis or graphic analysis for a single data item. Users can select analysis objects and make statistics for analysis objects in different time ranges.

4. Experimental Comparison and Analysis

Test time: June 1 to July 12, 2018.

Test site: a dairy farming community.

Experiment design: the experiment is divided into two groups: control group and experimental group. The control group adopts the traditional way of breeding, and the experimental group adopts the electric automatic cow management system of this paper. Four pairs in each group were randomly assigned.

4.1. Comparative Analysis of Standard Milk Yield in Different Stages

It can be seen from Table 1 and Figure 2 that the average standard milk production of the lactation test group is 21.49kg, which is 17.8% higher than that of the control group (18.24kg) ($P < 0.01$), and the feed milk ratio is 17.3% ($P < 0.01$). The average standard milk yield of lactation period test was 11.65kg, 12.77% higher than that of control group (10.33kg) ($P < 0.05$), and the feed milk ratio decreased by 8.3% ($P > 0.05$). The net milk consumption per 1kg standard milk in the experimental group was 1.79NND, 15.1% lower than that in the control group (2.11NND) ($P < 0.05$). In the later stage of lactation, the lactation rate of the experimental group was 2.43NND, 10.3% lower than that in the control group (2.71NND) ($P > 0.05$). The consumption of CP per 1kg in the experimental group was 122g, 10.9% lower than that in the control group (137g) ($P < 0.05$). In the later stage of lactation, the consumption of CP in the experimental group was 7.65% lower than that in the control group (183g) ($P > 0.05$).

Table 1. Statistical table of standard milk output in different stages.

Stage (No.)	group	control group	Test group
Lactation peak (A)	Initial milk production (kg)	21.75±2.54	21.74±3.12
	Daily standard milk production (kg)	18.24±1.66	21.49±1.81
	Feed milk ratio * (kg / kg)	0.92±0.07	0.76±0.07
	Standard grandma consumes NND	2.11±0.23	1.79±0.20
	Standard consumption CP (g / kg)	137±14	122±13
Late lactation (B)	Initial milk production (kg)	10.41±0.88	10.52±1.33
	Daily standard milk production (kg)	10.33±0.72	11.65±0.77
	Feed milk ratio * (kg / kg)	1.36±0.08	1.21±0.07
	Standard grandma consumes NND	2.71±0.34	2.43±0.42
	Standard consumption CP (g / kg)	183±26	169±25

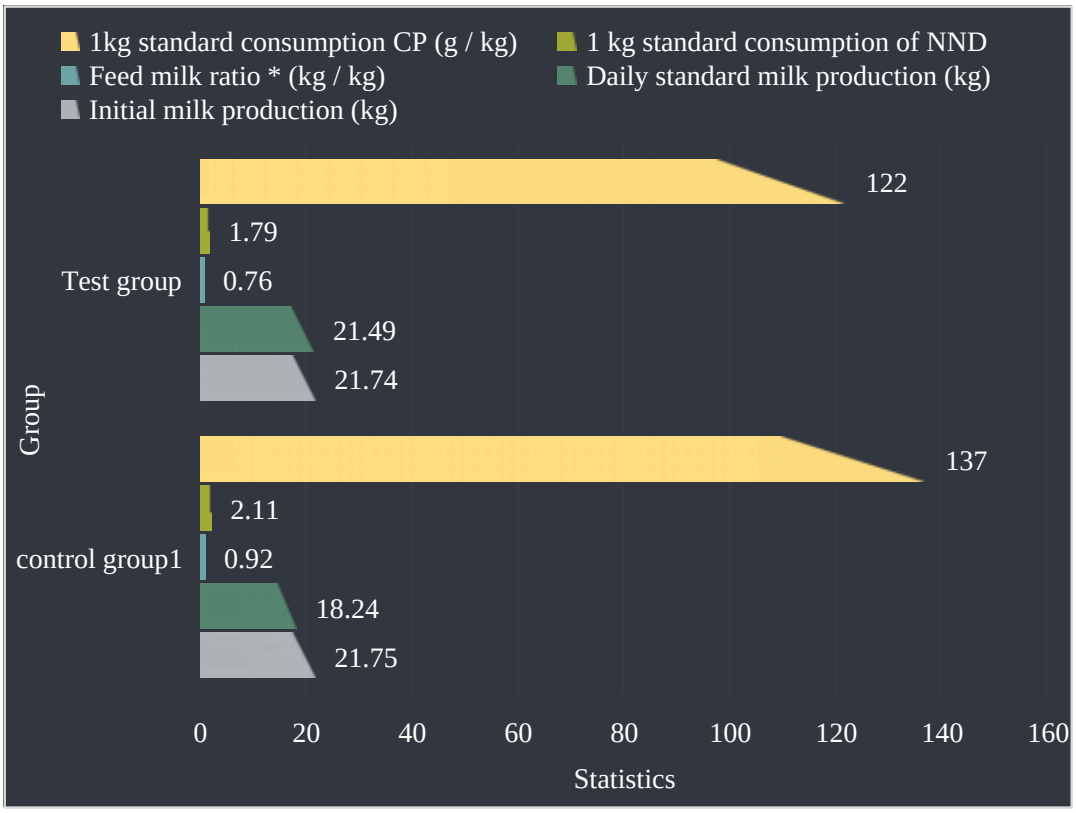

Figure 2. Statistical analysis chart of standard milk output in full lactation period

4.2. A Comparative Analysis of the Output of Standard Milk with Weight Correction in Different Stages

According to the feeding standard for dairy cows (NY / t35-2006), 26.32 milk production is required for each kilogram of weight gain, equivalent to 7.5 tons of standard milk. Each 1kg of

weight loss can provide 19.68 net milk production energy, which is equivalent to 6.48kg standard milk. It can be used to calculate the standard milk production after weight adjustment, that is, the standard milk production of dairy cows under constant weight.

It can be seen from Table 2 and Figure 3 that the standard milk production of the high lactation period cattle in the test group is 18.76kg, which is 24% higher than that in the control group (15.12kg) ($P < 0.01$), and the feed milk ratio is 22% ($P < 0.01$). In the late lactation experiment, the adjusted standard milk production was 16.89kg, 11.33% higher than that of the control group (15.17kg) ($P < 0.05$), and the feeding ratio was 15.6% lower ($P > 0.05$).

Table 2. Statistical table of standard milk output of body weight correction in different stages.

Stage (No.)	group	control group	Test group
Lactation peak (A)	Initial milk production (kg)	21.75±2.54	21.74±3.12
	Weight corrected milk production (kg)	15.12±1.32	18.76±1.67
	Feed milk ratio (kg / kg)	1.18±0.09	0.92±0.07
Late lactation (B)	Initial milk production (kg)	10.41±0.88	10.52±1.33
	Weight corrected milk production (kg)	15.17±0.79	16.89±0.98
	Feed milk ratio (kg / kg)	0.96±0.05	0.81±0.04

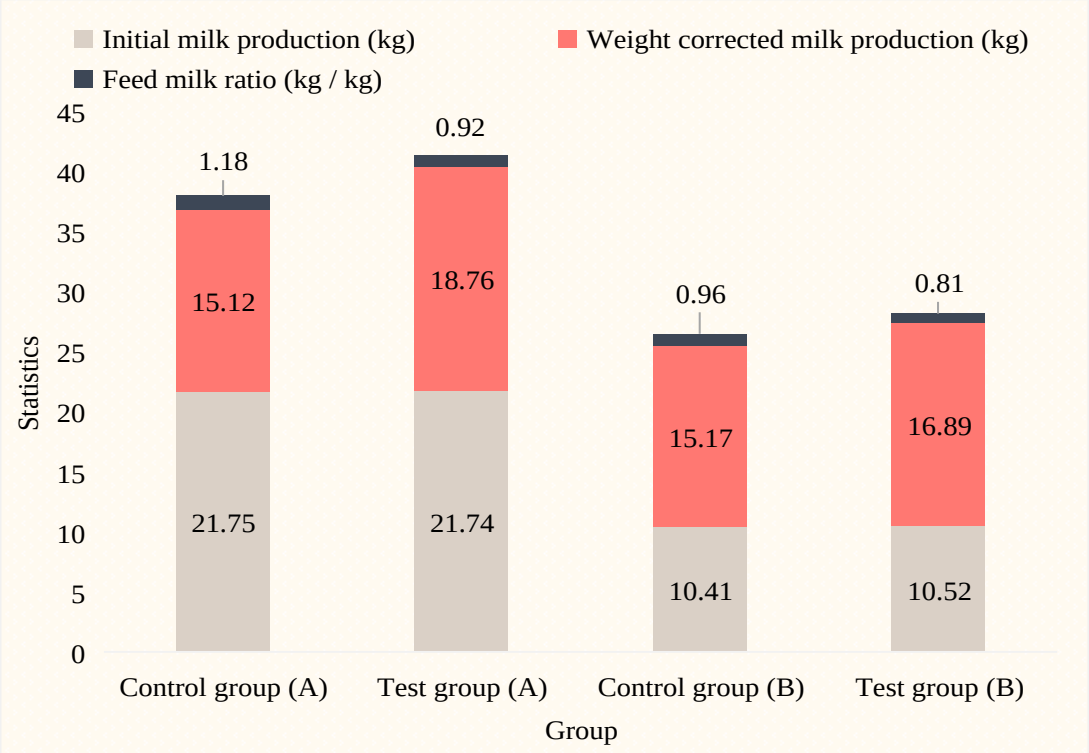

Figure 3. Statistical analysis chart of standard milk output corrected by body weight at full lactation and late lactation

4.3. Weight Change

It can be seen from Table 3 and Figure 4 that after calving, the weight of dairy cows dropped rapidly. The average daily weight loss of the control group was 1.08kg, 0.36kg more than that of the experimental group (0.72kg) ($P > 0.05$). In the peak period of lactation, the weight of dairy cows continued to decrease, but the rate of decrease was slow. The average daily weight loss of the control group was 0.48kg, 0.16kg more than that of the experimental group (0.32kg) ($P > 0.05$). In the late lactation period, the weight of dairy cows gradually increased. The average daily gain of the experimental group was 0.69kg, 0.14kg higher than that of the control group (0.55kg) ($P > 0.05$). Therefore, the use of electrical automation in the cow breeding system can make the cow recover in a short time, so that the cow is stronger than the traditional way.

Table 3. Statistical table of weight change.

Stage (No.)	group	control group	Test group
Lactation peak (A)	Initial weight (kg)	492 ±25	493 ±27
	Daily gain (kg)	-0.48 ±0.02	-0.32 ±0.06
Late lactation (B)	Initial weight (kg)	482 ±26	476 ±12
	Daily gain (kg)	0.55 ±0.13	0.69 ±0.01
Dry / perinatal (C)	Initial weight (kg)	538 ±18	536 ±25
	Daily gain (kg)	-1.08 ±0.16	-0.72 ±0.15

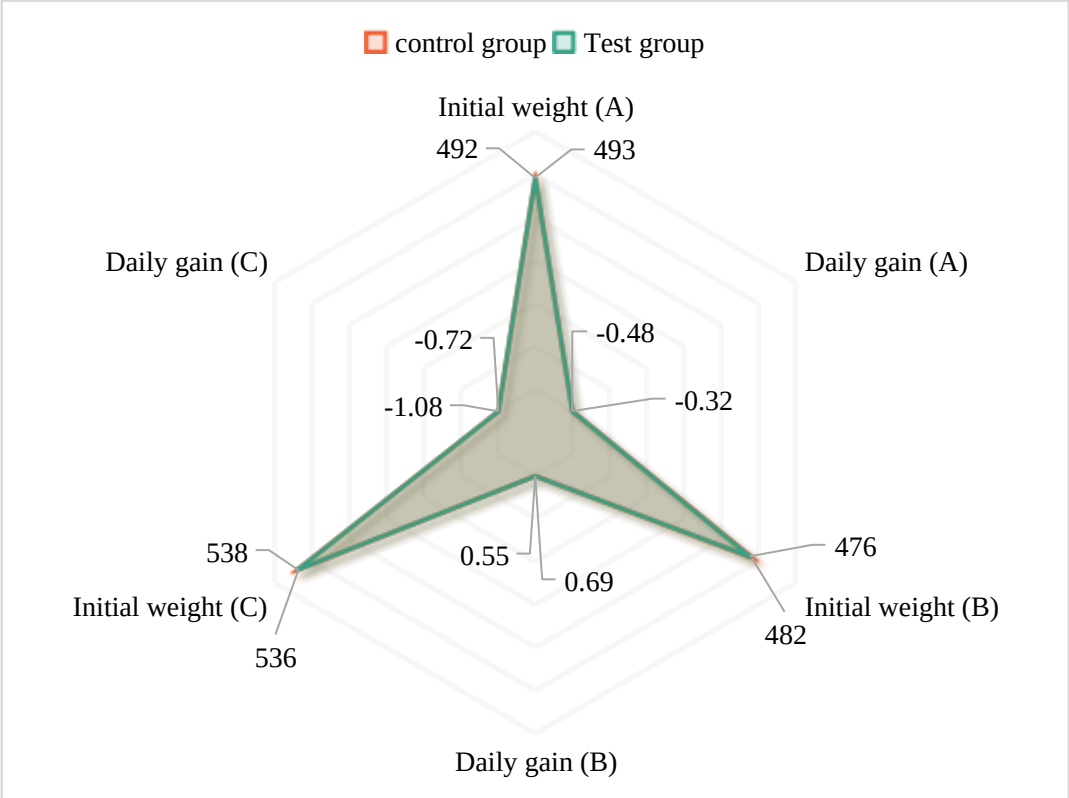

Figure 4. Statistical analysis chart of weight change

4.4. Production Benefit Analysis

The production efficiency is calculated according to the purchase price of fresh milk (¥2.4 / kg) and the local feed price (¥0.25 / kg); weeds: ¥0.12/kg; dry straw: ¥0.2/kg).

It can be seen from Table 4 and Figure 5 that the net profit of single cow in the test group is 3673 yuan, which is 797 yuan higher than that of 2877 yuan in the control group, and the production efficiency is 27.7% higher. The practice shows that the electric automatic cow feeding management system developed in this paper is superior to the traditional way in comprehensive production efficiency, and brings more final benefits to users.

Table 4. Production benefit analysis.

group	Total annual income	Feed cost	Cow depreciation	Other expenses	net income	Income increase
control group	11592	5625	1385	1176	3406	
Test group	12486	5432	1385	1176	4493	1087

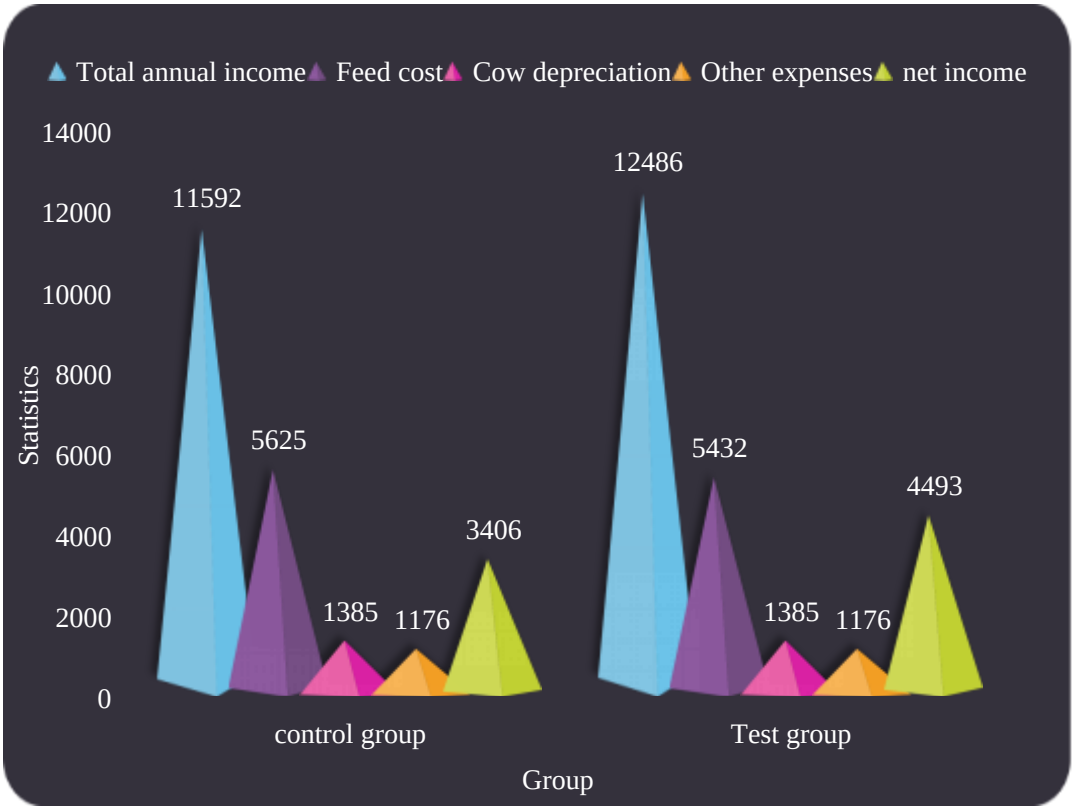

Figure 5. Production benefit analysis chart

5. Conclusion

With the continuous development of China's economy, people put forward higher requirements for the quality of life. As a high-quality nutritional supplement, the demand of milk is bound to rise. If the dairy industry wants to develop rapidly, it can't do without advanced modern management technology. However, due to the late start of the research on dairy automation management system in China, the overall technology is relatively backward. At present, it is still mainly manual, while the large-scale pasture is basically semi-automatic. In order to solve these problems, this paper proposes a cow feeding management system based on electrical automation. Through RFID technology, the tedious and inefficient manual collection is eliminated. Through the modular system

management, the whole process of intelligent management from feeding to sales is realized, and each can of products can be traced. Through the comparative experiment of the traditional method and the method in this paper, it can be seen from the data that the milk yield of the cow raised by the automatic management system in this paper has been greatly improved. After calving, the body weight of the cow decreased rapidly, and the cows in this system showed better physical recovery ability. When comparing the comprehensive production income, the systematic method in this paper is 27.7% higher than the traditional method. The comparative effect has obvious advantages and basically reached the international standard level, which has substantially improved the backwardness of feeding technology in China's dairy industry. In this paper, the experiment has achieved ideal results, which can be widely used.

Funding

This article is not supported by any foundation.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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