Retraction

Retraction: Harmless Treatment and Comprehensive Utilization of Dairy Farming Waste Based on Artificial Intelligence (J. Phys.: Conf. Ser. 1744 022004)

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The authors of the article have been given opportunity to present evidence that they were the original and genuine creators of the work, however at the time of publication of this notice, IOP Publishing has not received any response. IOP Publishing has analysed the article and agrees there are enough indicators to cause serious doubts over the legitimacy of the work and agree this article should be retracted. The authors are encouraged to contact IOP Publishing Limited if they have any comments on this retraction.

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Harmless Treatment and Comprehensive Utilization of Dairy Farming Waste Based on Artificial Intelligence

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Abstract: With the rapid development of social economy, people's living standards are constantly improving. Dairy farming, as the main source of people's demand for dairy products, plays an important role in the current social development. However, the disposal of its waste has always been a thorny issue. Therefore, the purpose of this paper is to study the harmless treatment and comprehensive utilization of dairy farming waste based on artificial intelligence. Finally, according to the actual investigation and comprehensive combination of artificial intelligence technology, this paper puts forward a dairy farming wastewater treatment system. The system uses artificial intelligence, multistage solid-liquid separation, biodegradation and other technologies, which can effectively treat the wastewater produced during dairy farming with good treatment effect and stable effluent index. In this paper, through experimental research, it is found that the quality of the treated wastewater is higher than the farmland irrigation standard by using the dairy farming wastewater treatment system based on artificial intelligence, and the effluent quality is lower than 200ml/g after advanced treatment. This will greatly improve the current ecological environment pollution, improve the scale process of aquaculture industry, provide an institutional system for the construction of waste discharge and utilization, and also provide new impetus for the green development of dairy farming industry.

Keywords: Artificial Intelligence, Waste from Dairy Farming, Harmless Treatment and Comprehensive Utilization, Wastewater Treatment System for Dairy Farming

1. Introduction
In the dairy farming industry, with the continuous development of social economy and the wide spread
of artificial intelligence technology, many dairy farms at home and abroad have established some effective waste treatment systems, which greatly improves the waste treatment efficiency of farms. At the same time, due to the lack of unified planning and various imperfections of farm waste system, it is very urgent to study the harmless treatment system of dairy farming waste based on artificial intelligence.

At present, with the continuous development of artificial intelligence technology, there are many waste treatment systems constructed by using artificial intelligence related technologies. In foreign countries, Rahman believes that animal husbandry industry should focus on environmental protection, especially on reducing greenhouse gases, and make use of the transformation and transformation of the overall livestock breeding system to enhance its carbon sequestration capacity by technical means, thus contributing to the promotion of environmental pollution prevention, agricultural ecological cycle, poverty eradication and economic development[1]. In China, there are many similar technology platforms. Long Jie analyzed the scale of livestock and poultry breeding in China under the background that more and more attention is paid to the harmless treatment of waste generated by livestock and poultry breeding, and pointed out that the combination of aerobic fermentation treatment technology, artificial intelligence and natural ecological treatment technology should become the trend of domestic livestock and poultry waste treatment technology in the future [2].

In this paper, aiming at the harmless treatment and comprehensive utilization of dairy farming waste based on artificial intelligence, starting from the actual situation of dairy farming, the types and hazards of dairy farming waste were analyzed, the amount of dairy manure and various pollutants was estimated by using formulas, and the pollution situation of dairy farming waste was analyzed from the perspective of overall output and regional pollution. This has important reference significance for further exploring the green development of dairy farming industry.

2. Technology of Harmless Treatment and Comprehensive Utilization of Dairy Farming Waste Based on Artificial Intelligence

2.1 Artificial Intelligence
Artificial intelligence is a new technical science that researches and develops theories, methods, technologies and application systems for simulating, extending and expanding human intelligence.

Artificial intelligence is a branch of computer science, which attempts to understand the essence of intelligence and produce a new intelligent machine that can respond in a similar way to human intelligence[3]. The research in this field includes robot, language recognition, image recognition, natural language processing and expert system. Artificial intelligence can simulate the information process of human consciousness and thinking. Artificial intelligence is not human intelligence, but it can think like human beings, and it may surpass human intelligence [4].

2.2 Dairy Farming Waste Treatment Methods

(1) cow dung treatment method

1) produce organic fertilizer
Cow dung is rich in organic components such as crude fiber, crude fat, crude protein and nitrogen-free extract, which are mixed and piled up with organic substances such as straw and weeds. When the relative humidity is controlled at about 70% and an environment for aerobic fermentation is created, microorganisms will multiply in large numbers. Organic matter will be decomposed and converted into odorless and fully decomposed active organic fertilizer.

2) Biological treatment
Using earthworms to treat cow dung is a combination of traditional composting method and biological
treatment method. Using the metabolism of earthworms, which can secrete decomposed proteins, fats and carbohydrates, the feces are transformed into earthworm dung with excellent physical, chemical and biological characteristics. After being applied to farmland, it can improve soil structure, loosen soil, increase soil permeability, prevent soil surface hardening and improve soil fertility. Therefore, using earthworms to treat organic wastes is considered to be an effective method [5].

3) ferment and cultivate edible fungi with cow dung
Cow dung is rich in organic matter, nitrogen, phosphorus, potassium and other elements. After adding certain auxiliary materials, it can cultivate edible fungi. Using cow dung to cultivate edible fungi solves the environmental pollution problem of cow dung to a certain extent, and increases the income through edible fungi, which can kill two birds with one stone.

(2) Treatment method of bovine urine

1) physical treatment
Physical treatment is to separate organic pollutants, suspended solids, oils and other solid substances from sewage by physical action. Commonly used methods include precipitation and filtration. Generally, the wastewater from dairy farms passes through the grille to remove floating objects, such as grass dust and large dung balls, and then enters the filter.

2) Chemical treatment
Chemical substances are added into the sewage, and the pollution impurities in the sewage are separated and recovered by chemical reaction, or converted into harmless substances, and the soluble or colloidal substances in the sewage are treated. Coagulants such as ferric chloride, aluminum sulfate and ferrous sulfate are used to precipitate suspended solids and colloidal substances in sewage to achieve the purpose of purification, and hypochlorous acid is added for disinfection [6].

3) Biological treatment
With the action of microorganisms, the organic matter in sewage is decomposed. Most of the microorganisms used to purify sewage are bacteria. In addition, there are fungi, algae, protozoa and so on. Oxidation pond, activated sludge process and constructed wetland are mainly used for treatment.

2.3 Dairy Farming Wastewater Treatment System

(1) The production and characteristics of wastewater
Dairy farming wastewater mainly includes domestic wastewater and flushing wastewater. Among them, flushing wastewater includes cowshed flushing wastewater and milking parlour flushing wastewater.

Dairy farming wastewater belongs to organic wastewater with high concentration and difficult degradation. It has its own characteristics: it contains a lot of organic pollutants and nutrients such as nitrogen and phosphorus, such as high chemical oxygen demand, suspended solids and ammonia nitrogen, and high biochemical pollution load. But also contains a large number of pathogenic microorganisms, parasitic eggs and breeding mosquito pupae, accompanied by odor which is difficult to remove [7].

(2) Process flow
Under the automatic control of artificial intelligence, the spiral extrusion solid-liquid separator performs solid-liquid separation on the waste liquid, and then enters the middle pool, and then continues the secondary and tertiary separation.

The advanced treatment system adopts the process of coagulation first and then air flotation to
decolorize the wastewater and further purify the wastewater quality. The solid is pumped to the sludge concentration tank by air pump, and the cow dung separated from solid and liquid enters the sludge concentration tank together with the sludge produced by sedimentation tank, CASS tank and air flotation. After pressure filtration and dehydration, the mud cake is transported to the composting area for composting treatment [8].

(3) Relevant theories of design and construction system

1) artificial intelligence PSO algorithm

In order to better solve the coordination problem of three factors of fitness function in planning method and give full play to the advantages of PSO algorithm in solving combinatorial optimization problem, PSO algorithm is proposed to solve the problem of autonomous optimization, which will be more helpful to improve the autonomous control of dairy farming wastewater treatment system [9]. The fitness function of the optimization algorithm is:

\[ G = \left[ F - W \right] * f_2 \]

\[ f_1 * f_3 \]

(1)

In which \( f \) represents a three-dimensional vector, i.e., \( F = (f_1, f_2, f_3) \), and \( w \) represents the three-dimensional space of particle swarm, i.e., \( W = (w_1, w_2, w_3) \). \( |F - W| \) represents the module of vector \( (F - W) \). We can see that the fitness function \( G \) is directly related to the weight coefficients \( w_1, w_2 \) and \( w_3 \) to be optimized. As long as we give a set of values of \( f_1, f_2 \) and \( f_3 \), we can determine a \( F \) and thus a \( G \). The purpose of PSO optimization is to find the weight coefficients \( w_1, w_2 \) and \( w_3 \) when the fitness function \( g \) is minimized.

2) Annual output of cow manure

Dairy cow stock is a relatively stable value in dairy cow feeding, so it is more stable and reasonable to calculate dairy cow manure discharge. Therefore, according to cow dung excretion coefficient, feeding cycle and annual cow stock, the annual cow dung and urine production in different years can be obtained [10]. The formula for calculating the annual output of cow manure is:

\[ Q_i = \sum N_i * T \]

(2)

In which \( I \) is the year, \( q \) is the annual output of feces and urine of pigs, \( p \) is the excretion coefficient of feces and urine, \( n \) is the annual stock of dairy cows and \( t \) is the feeding period of dairy cows.

The formula for calculating the discharge of different pollutants in pig manure is:

\[ L_{iy} = \sum Q_{iy} * X_{iy} \]

(3)

Among them, \( Y \) is the type of pig manure pollutants, \( L \) is the amount of pig manure pollutants, and \( X \) is the average content of pollutants in pig manure.

3. Experimental Study on Harmless Treatment and Comprehensive Utilization of Dairy Farming Waste Based on Artificial Intelligence

3.1 Experimental Data

In this paper, 300 adult and healthy dairy cows in dairy farms were selected and divided into two groups, A and B, which were investigated for six months, and the amount of fecal liquid, wastewater and fecal pollutants was counted.
3.2 Experimental Process

During the six months of the experiment, the amount of fecal liquid, wastewater and fecal pollutants produced by A and B groups should be classified and counted, and analyzed and compared. The wastewater from group B cows was treated by traditional methods. Finally, the effluent quality and impurity content of the wastewater treated by the two methods are compared.

4. Experimental analysis of Harmless Treatment and Comprehensive Utilization of Dairy Farming Waste Based on Artificial Intelligence

4.1 Waste Statistics of Dairy Cows in Groups A and B

We counted the amount of fecal liquid, wastewater and fecal pollutants produced by 300 cows in dairy farms in 6 months under the conditions of normal life of dairy cows. This paper analyzes the pollution situation of dairy farming waste from the perspective of total output and regional pollution, so as to lay a good foundation for designing waste treatment system based on artificial intelligence. The statistical results are shown in Table 1 and Figure 1.

Table 1. Statistics of dairy farming waste

| Month         | The 1st month | The 2nd month | The 3rd month | The 4th month | The 5th month | The 6th month |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Manure production(t) | 460           | 455           | 447           | 430           | 432           | 428           |
| Waste water output(t) | 1506          | 1515          | 1494          | 1487          | 1474          | 1489          |

Figure 1. Statistics of pollutant output

From the results of investigation and statistics, it can be seen that due to the improvement of science and technology, the upgrading of breeding equipment, the restriction of environmental protection policy and the high pressure of environmental protection law enforcement, the total amount of cow manure and wastewater produced fluctuated slightly, and showed a slow downward trend on the whole. All pollution indicators show that the pollution caused by cow manure and wastewater is serious, so it is very urgent to treat these pollutants well and effectively.

4.2 Actual Treatment Effect of Dairy Farming Wastewater Treatment System

In this paper, according to the actual situation of wastewater produced by dairy cows every month, the wastewater produced by group A dairy cows is treated by the dairy farming wastewater treatment system, while the wastewater produced by group B dairy cows is treated by traditional methods. In this
paper, the processed data are visualized, and the processing effects of the two methods are analyzed. We fit the effluent quality of the treated wastewater of Group A and Group B according to the mean value, and get the wastewater treatment effect diagram of Group A and Group B. As shown in Figure 2.

![Figure 2. Comparison of effluent quality](image)

From the experimental results, it can be seen that there is a great difference in effluent quality between A and B groups. This is mainly because the dairy farming wastewater treatment system proposed in this paper is deeply combined with artificial intelligence technology, which comprehensively improves its automation level and improves its wastewater treatment efficiency and quality. Combined with multi-stage solid-liquid separation technology, the load of subsequent treatment is reduced, and the power consumption and dosage are reduced.

5. Conclusions
Based on artificial intelligence, this paper studies the harmless treatment and comprehensive utilization of dairy farming waste, and puts forward a dairy farming wastewater treatment system. According to the actual situation of dairy farming, this paper analyzes the types and hazards of dairy farming wastes. The yield of dairy manure and pollutants was estimated by using relevant formulas, and the pollution status of dairy farming waste was analyzed from the perspective of total output and regional pollution. Secondly, combing the policy background and current situation of dairy waste management and resource utilization, and combining with field investigation cases, finding out the existing problems of dairy waste management and resource utilization. Combined with artificial intelligence technology, a dairy farming wastewater treatment system was put forward to effectively treat the wastewater produced during dairy farming, and experiments proved that the system has a great role in treating the wastewater produced by dairy farming. This will greatly promote the further exploration of the green development of dairy farming.

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