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To cite this article: Qi Ou *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **242** 042019

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Development of DT-12-01 Intelligent Biological Deodorizer

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Abstract. This paper describes the general structure and working flow of DT-12-01 intelligent biological deodorizer, introduces its main technical parameters, and analyzes its working principle and structural features. With simple and compact structure, easy operation, and high reliability, it has two working modes which include intelligent and manual modes. If number of nozzle is 8-16, pressure is 4-7 Mpa, and flow rate is 1.2 L/min, its effective spraying range will be 15-60 m² with droplet sizes around 1-10 μ m. It can be widely used in such places as urban sewage, trash, and feces treatment plants, breeding farms, slaughter houses, hospitals, food processing plants, etc.

1. Overview

With the acceleration of urbanization in recent years, urban population is increasing day by day and the output of household waste is increasing rapidly at the rate of 8~10% [1-2]. At present, more than 95% of household waste is treated by landfill [3]. However, a large amount of toxic and harmful odorous gases will be generated from the landfill, which may seriously affect human survival and sustainable development of our environment. How to eradicate malodor has become an important research topic in various fields. In the past, activated-carbon adsorption, chemical treatment, filtration, ozonated-water spraying and shielding were often used for deodorization. Although these methods can achieve certain results in a specific range, it is difficult to get the expected results beyond this range, and even more they may cause secondary pollution. So, the development of methods and equipment with good deodorization effect is needed urgently. Compared with traditional physical and chemical deodorizations, biological deodorization has the advantages of high treatment efficiency, no secondary pollution, simple process, wide scope of application and low cost, etc., and thus has been widely used and expanded rapidly [4-5]. To solve the above problems, we developed DT-12-01 intelligent biological deodorizing machine through repeated tests and improvements. This deodorizer owns simple and compact structure, easy operation, and high reliability, and has two working modes which include intelligent and manual modes, and can be widely used in such places as urban sewage, trash, and feces treatment plants, breeding farms, slaughter houses, hospitals, food processing plants, etc.

2. General structure and working principle

2.1. General structure

The structural diagram of DT-12-01 intelligent biological deodorizer is shown in Figure 1. This machine is mainly composed of two parts: automatic proportioning and high-pressure spraying systems. Automatic proportioning system is mainly composed of medicine tank, solenoids, sensors,



rationing tank, tap-water filter and mixing tank, among which there are three solenoids and four sensors. High-pressure spraying system is mainly composed of motor, high-pressure pump, high-pressure pipes, high-pressure nozzles, etc. The specific structural details are shown in Figure 2.



Fig. 1: Structural diagram of DT-12-01 intelligent biological deodorizer

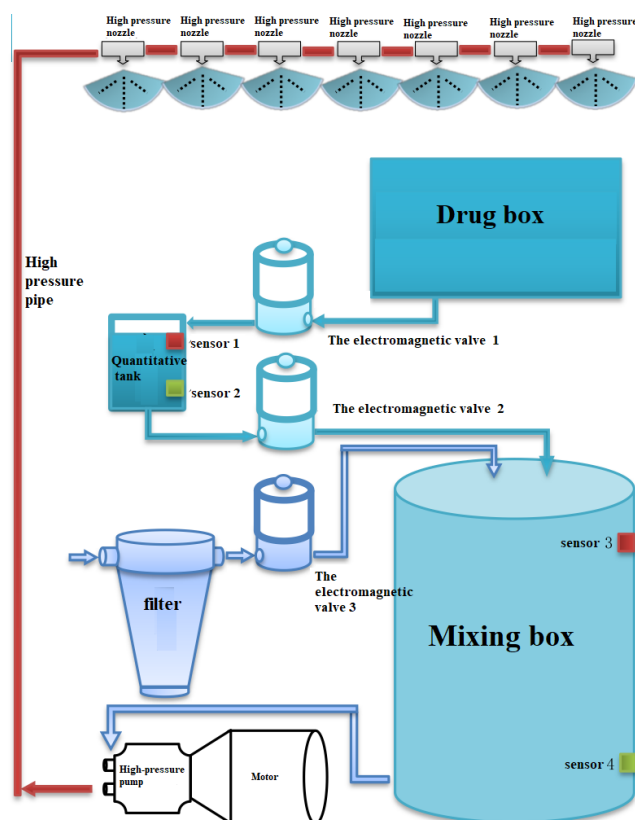


Fig. 2: Structural details of DT-12-01 intelligent biological deodorizer

2.2. Working flow

The working flow of DT-12-01 intelligent biological deodorizer is shown in Figure 3.

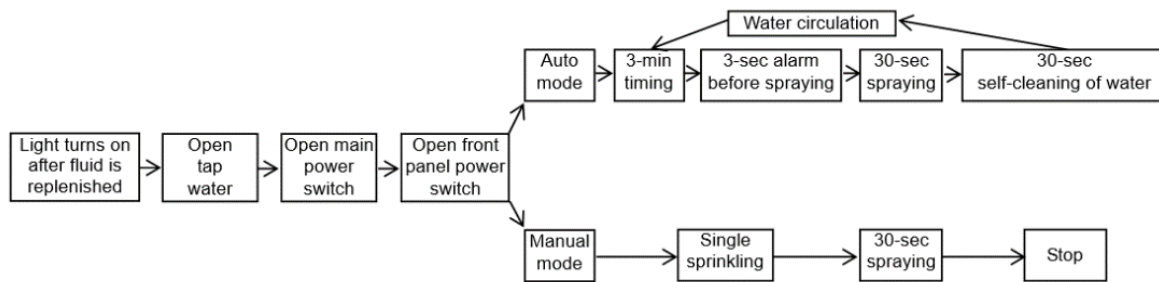


Fig. 3: Working flow of DT-12-01 intelligent biological deodorizer

2.3. Working principle

Automatic proportioning system: When the low-level sensor of the mixing tank detects that the water level is too low, the deodorant will be diluted and mixed automatically, and the tap water's solenoid and deodorant discharge's solenoid will be opened to replenish both proportioned microbial preparation and tap water into the mixing tank to complete the automatic proportioning.

High-pressure spraying system: After fully mixed with tap water, the microbial preparation is pressurized to 4-8 Mpa by high-pressure pump, enters the high-pressure pipeline, and is ejected out at high speed through the nozzle to form 1-10um fine deodorization particles which contact with the off-flavor and odor fully and decompose the pollutants under the action of micro-organisms so as to achieve the purpose of deodorization.

3. Structural features and main technical parameters

3.1. Structural features

The device has the following characteristics in structure:

Intelligent control: Deodorant's spraying time and frequency can be pre-set and automatic switching, automatic spraying and unattended operation can be achieved.

Automatic replenishment: Deodorant can be mixed with tap water according to the pre-set proportion for automatic replenishment and automatic proportioning without the need of manual proportioning and mixing.

Safe and reliable: The safety of operation is fully considered when designing circuits which contain such functions as leakage protection, overload protection, surface cleaning, etc.

Protection design: The design and materials of the equipment ensure that it can be used normally in humid environments, open grounds vulnerable to both wind and rain, dusty areas and other operating conditions.

Liquid level protection: A liquid level protection system is provided. When there is water shortage, the high-pressure pump will stop automatically and water is refilled automatically to the pre-set level. After water reaches the pre-set level, the high-pressure pump will resume running automatically.

3.2. Main technical parameters

Power source: 220V/50HZ

Power: 0.18kW

Operating mode: Intelligent/manual

Flow rate: 1.2L/min

Pressure: 4-7Mpa

Speed of revolution: 1450r/min

Droplet size: 1-10um

of nozzles: 8-16

Effective spraying range: 15-60 m²

Weight: 61.3kg

Dimensions (L x W x H): 650×450×1060mm

4. Conclusions

(1) DT-12-01 intelligent biological deodorizer has the advantages of simple and compact structure, simple operation and high reliability.

(2) This machine has two working modes which include intelligent and manual modes. If its number of nozzles is 8-16, pressure is 4-7 Mpa and flow rate is 1.2 L/min, the effective spraying area will be 15-60 m² with droplet sizes around 1-10 μm.

(3) Its main body is made of 304 stainless steels and the materials of solenoids, pipelines and fittings are also made from 304 stainless steels to bring us high corrosion resistance and durability.

(4) This equipment has the functions of de-dusting, deodorization, cooling, desinsection, sterilization and surface cleaning, etc. and can be widely used in urban sewage, trash, feces treatment plants, breeding farms, slaughter houses, hospitals, food processing plants and others.

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