



Urban Black and Odorous Water Treatment Technology and Its Development Trend

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Abstract

Against the backdrop of sustained economic growth, China is facing serious environmental pollution problems. In recent years, the public's awareness of environmental protection has weakened, and environmental management policies have not been strictly enforced, resulting in the common problem of black and odorous water bodies in cities. Eutrophication of water bodies has a significant impact on the quality of urban environment and the sustainable development of the economy and society. Therefore, strengthening the governance of urban black and odorous water bodies is becoming an important task of modern urban management, and it is also the only way to accelerate the construction of a prosperous society and improve people's lives.

Keywords

Urban black and smelly water; Treatment technology; Development trend

The blackness and odor of water are manifestations of water pollution. The color and odor of water are very unpleasant. Eutrophication of water bodies is the main cause of blackness and odor. Many organic pollutants enter and dissolve in water, consume oxygen, cause hypoxia in water bodies, and form chemical reactions in water, such as iron and sulfur compounds. The main causes of odor are FeS, MnS and other dark substances, ammonia NH₃, H₂S and other gases produced by the corrosion of organic matter. Black and odorous water bodies are important targets of water pollution prevention and management action plans, and comprehensive treatment of water bodies throughout the city is required.

1. Urban black and odorous water treatment technology

1.1 Strengthen the construction of sewage and rainwater pipe network systems

When treating black and smelly water bodies, the drainage system must usually be planned according to the climatic conditions and environmental characteristics of the area, urban planning, and the construction of wastewater treatment plants and other urban facilities, and the water purification system needs to be continuously improved and optimized. It is necessary to take measures to prevent pollutants from being directly discharged into rivers and to centrally treat various types of wastewater in urban rivers. If the city's natural precipitation is relatively high, the channel drainage method should be adopted to modify the existing overflow drainage system and prevent the overflow from directly flowing into the fully integrated canal river. A system must also be designed. If the city can build a separate canal, the construction of drainage pipes and water storage facilities must be strengthened, and after the sewage is treated, rainwater should be used reasonably. If the city's natural precipitation is low, storage facilities and

pipes should be used to prevent the waste of water resources so that wastewater cannot be effectively treated. And the rainwater stored in this way can be used to irrigate plants and crops, and carefully clean and wash furniture [1].

1.2 Biological ecological restoration

Years of practice have shown that it is difficult to achieve the goal of long-term wastewater treatment by significantly improving water quality and following simple physical and chemical recovery methods. In organic bioremediation technology, plants and microorganisms can be used as primary scavengers, and their growth and metabolic functions are used to remove and replace pollutants, thereby achieving the effect of improving water quality. Ecological bioremediation can help restore the functionality and self-cleaning capabilities of water systems. When it comes to treating black and smelly water bodies, biological environmental remediation technology is currently considered to be the most promising treatment technology. Organic organisms commonly used to treat black and smelly water bodies include biofilm methods, artificial wetlands, floating islands and freshwater lakes. The biofilm method uses components such as gravel and fibers as carriers, where microorganisms attach to the surface and can destroy pollutants in the water. Benefiting from the growth and metabolic functions of microorganisms, wetlands refer to the creation of wetland systems to remove pollutants and ensure water quality through the comprehensive effects of the system's physics, chemistry and biology. The ecological floating island is a plant-based governance technology made of plants used as polymer fillers and plants with water purification functions to purify water quality. In addition to the ability of plants to grow, absorb and remove pollutants, their roots provide a good environment for microorganisms and aquatic animals and promote aquatic biodiversity, increasing and promoting the recovery of aquatic ecosystems. Functional plants commonly used in organic floating islands include hemp, water hyacinth, water peanut and reed. In ponds, planting aquatic plants in polluted ponds can treat black and smelly water bodies with ecosystem restoration and water purification functions [2].

1.3 Analysis of governance technologies for effectively controlling point source pollution

First of all, it is necessary to centrally treat the internal wastewater generated in the city and ensure that all departments strictly comply with the emission standards and strictly control the emission. In terms of production volume and performance control, it is also necessary to meet the technical requirements of the urban water supply network. In order to ensure the quality of the water flow, technology should be used for waste treatment, and bio-air filters or membrane reaction methods should be used to purify the water source. The content of wastewater generated by urban industrial parks should be greatly reduced and strictly follow the urban sanitation standards to alleviate the difficulties in treating wastewater. In the actual cleaning process, cleaning technologies must be selected according to different pollutants. For example, high-salinity wastewater can be widely treated by versatile independent evaporation membrane technology. If the pollutants are not degradable, they must be treated using advanced oxidation and other technologies. Industrial wastewater treatment can improve wastewater efficiency through various applications of membrane technology, advanced oxidation and adsorption technology. Poultry farms in adjacent urban areas must meet wastewater treatment and discharge standards before they can be discharged into urban waterways. At the same time, it should be encouraged to introduce wastewater classification procedures to separate breeding plants, poultry, livestock and urine, increase the use of solid fertilizers in manure, and promote and apply treatment methods for collecting rainwater.

If wastewater treatment is required, highly efficient anaerobic biological treatment can be used to remove nitrogen and phosphorus and ensure that wastewater discharge meets standards. In adjacent urban and rural areas, it is necessary to carry out overall planning and management based on the drainage distribution characteristics. For example, it is necessary to classify the causes of wastewater pollution and take effective measures to use these resources. The sewage treatment system requires centralized wastewater collection and management. If wastewater is treated directly from the city sewer, resource management and resource solutions should be formulated in advance. If construction is difficult, more effective measures should be replaced.

1.4 Chemical remediation

Chemical treatment is carried out by adding hydrogen peroxide, ferrite, aluminum salts, rapeseed and other chemicals through oxidation, precipitation to achieve the purpose of removing pollutants. Chemical treatment can reduce the concentration of pollutants in water and significantly improve water quality in a short period of time.

2. Analysis on the technical development trend of urban black and odorous water treatment

The causes and principles of urban black and odorous water bodies are very complex, which requires the joint participation of engineering technology, natural science, management science, economics and social science to develop corresponding treatment technologies, improve its management and realize the effective treatment of black and odorous water bodies.

2.1 Treatment technology should be developed towards controlling pollution sources

The core of urban black and odorous water treatment is to effectively control the source of pollutants, which can be controlled by building an appropriate pipeline network, but dust generated by urban ambient air, urban agricultural production and factories is still the main problem causing urban water pollution. Therefore, it depends on the management of pollution sources, but in the future, it is necessary to improve the ability to manage pollution from the source. According to the high-efficiency dephosphorization, denitrification and decarbonization treatment technology, nitrogen and phosphorus in wastewater are reused. It is also necessary to continuously improve advanced treatment technology and focus on saving energy and resource consumption. In this way, it is expected to enhance the synergistic effect and the widespread use of treatment technology, such as blocking surface water flow and early control of precipitation, which can effectively improve the impact of pollution. In order to continuously improve sewage treatment technology, it is necessary to research and develop new materials and treatment methods, as well as develop environmentally friendly products, such as new oxidative bioinhibitors in the environment [3].

2.2 Utilization of sediment resources

When mud is abused during drilling, it not only occupies a large amount of soil, but also causes water pollution. The water in the mud is likely to produce harmful gases. Therefore, the use of sludge as a treatment resource needs to be strictly reviewed. The pollution level of the sediment used must be analyzed and appropriate risk assessments must be conducted. Ceramsite, cement and other materials can be used as a good sludge treatment resource, which can bring good treatment effects to sewage treatment.

2.3 Improved bioecological methods

Biological treatment methods are effective, economical, efficient and can be fundamentally managed. However, in practical applications, we know that the growth cycle of microorganisms is long, which has a great impact on the growth conditions of plants and the quality requirements of plants. Therefore, by developing new varieties and reducing dependence on the environment, it can be used as a means to further optimize biological and ecological methods, improve the flexibility of microorganisms and plants, and reduce dependence on climatic conditions.

2.4 Sediment dredging and repair

Currently, there are two types of floor sludge treatment technologies: on-site treatment technology and off-site treatment technology. On-site treatment technology mainly involves the use of physical and chemical methods to reduce the amount of pollutants, reduce the dissolution of pollutants, and prevent the release of pollutants. Off-site treatment technology refers to the treatment of degraded transport waste. The most common method is to reasonably treat potential waste underground and carry out bottom sludge dredging and repair, and finally restore the original protected state of the river water [4].

3. Conclusion

In the past, due to poor environmental protection concepts, the urban water environment was seriously polluted during the social and economic development of our country. The causes of urban black and odorous water bodies are complex, including external and internal pollution sources. In this case, it is necessary to take corresponding treatment technologies to improve the treatment of black and odorous water bodies. At the same time, it is necessary to strengthen the long-term treatment mechanism of prevention and efficiency of urban water management. At the same time, government agencies and relevant researchers can continue to strengthen the research, development and use of urban black and odorous water treatment technologies, improve the treatment of urban black and odorous water bodies, enhance the effect of black and odorous water treatment, and provide urban residents with an environmentally

friendly environment, which not only speeds up the treatment of the environment, but also lays a good foundation for urban construction and development.

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