Problems and Countermeasures in Water Pollution Control

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Abstract. With the continuous advancement of industrialization, the problem of water pollution around the world is becoming more and more serious, and the problem of water resources is facing a huge test. To scientifically control water pollution, it is necessary to fully understand the sources of water pollution and the problems existing in the treatment process. At present, water pollution control methods include activated sludge method, flocculation and sedimentation, and ion exchange. The current situation of water pollution is relatively severe, and the pollution channels are widespread, mainly through industrial pollution, agricultural pollution and domestic pollution. This paper objectively and systematically analyzes the current methods of water pollution control, summarizes the current situation of water pollution sources and the problems existing in water pollution control, and appropriately puts forward the future research and development direction, which can be used as a reference for the development of water pollution treatment technology in the future.

Keywords: Water pollution; Workaround; Water environment protection.

1. Introduction

Water is the source of life, and it is closely related to people's lives. Water is an important component of the human body and a necessary condition for national development. However, the growth of modern society's population, the rapid development of industrial and agricultural production activities, and the rapid advancement of urbanization, have brought a painful blow to the limited global water resources and water environment. Our water resources and air quality are currently facing significant pressure. Therefore, it is necessary to study the pollution problem in water resources.

In recent years, both domestically and internationally, certain achievements have been made in the treatment of water pollution. The current main methods for controlling water pollution include physical, chemical, and biological methods. Physical methods are a technique that utilizes physical means to transfer pollutants from groundwater, including adsorption, gas diffusion, groundwater extraction, and artificial infiltration enhancement. The contaminated groundwater is transferred from the contaminated underground area to other areas through physical means to achieve the purpose of remediation [1]. The chemical method mainly aims to treat pollutants by oxidizing and reducing them into harmless substances. Commonly used reagents include ozone, chlorine dioxide, etc. The cost is high, and attention should be paid to by-products during the treatment process to prevent the occurrence of secondary pollution. Biological methods achieve purification goals through the action of microorganisms. Biological methods are suitable for sites contaminated with biodegradable organic compounds, including petroleum hydrocarbons, benzene series, chlorinated hydrocarbons, etc. These organic compounds have a faster degradation rate and better purification effect [2].

This article aims to explore the issue of pollution in water resources. Analyze from the sources of pollution and simple treatment methods. Provide theoretical basis and suggestions for future water pollution control, and enrich relevant research.

2. The Current State of Water Pollution

2.1. Industrial Pollution

Industrial water pollution is caused by wastewater discharged from equipment, devices, and places during industrial production activities, and is one of the main factors of water pollution. This includes industrial electroplating wastewater, smelter industrial wastewater, and petrochemical organic wastewater. Industrial pollution has the characteristics of large pollution volume, wide pollution area, difficulty in purification, and complex composition.

2.2. Agricultural Pollution

Agricultural water pollution is groundwater pollution caused by agricultural activities. Mainly including residual pesticides, fertilizers, and livestock manure in the soil. The pollution is caused by nitrogen, phosphorus, and other organic or inorganic pollutants generated in agricultural production activities entering water bodies through surface runoff, soil flow, and underground leakage during precipitation or irrigation. Agricultural pollution has the characteristics of large regional differences, small and dispersed scale, and difficult management.

2.3. Pollution of Life

Domestic water pollution is mainly caused by various detergents and pollutants used in urban life, as well as household waste such as garbage and feces, increasing the total mineralization, total hardness, and chloride content of groundwater. Sometimes, it can also cause pathogen pollution. Domestic water pollution has the characteristics of multiple types of pollutants, large emissions, high density, and randomness.

3. Problems in the Treatment of Water Pollution

3.1. Imperfect Management System

Industrialization has promoted globalization, and the industrialization of countries around the world has brought great challenges to the environment. The damage to the ecological environment caused by the "three wastes" has become more and more prominent, and the main source of pollution is the pollution brought by industrialization. Many enterprises and manufacturers only pay attention to improving ecological benefits and interests in production activities, and then ignore the protection of the natural environment. As a result, the lack of attention to environmental protection, particularly by some unscrupulous enterprises violating regulations, exacerbates the pollution of natural resources. Because some relevant departments and enterprises lack relevant management measures for water resource protection, the regulatory system is not perfect, and there are many loopholes in the management system, so factories are rampant, water pollution cannot be effectively controlled, and the global water environment pollution is aggravated.

3.2. Relatively High Cost

Some underdeveloped countries have weak equipment R&D and manufacturing capabilities, core equipment is dependent on imports, and some developed countries have monopolies. In order to control water resources, underdeveloped countries must invest a lot of money to purchase advanced sewage treatment equipment, which will also increase the cost of construction, operation, and maintenance in the later stage, and then increase the economic burden of enterprises and factories. Some small factories and enterprises cannot even afford the high cost of environmental protection, which in turn exacerbates the deterioration of the country's water conservation situation.

3.3. Low Environmental Awareness

Both enterprises and residents are not aware of the protection of environmental pollution enough, and some enterprises and residents directly discharge waste into rivers, causing environmental pollution. They are only aware of the impact of environmental pollution on the environment, but cannot fundamentally restrain their behavior. As a result, the concentration of pollutants in the water directly exceeds the standard value. However, due to the weak awareness of environmental protection among the public, even if the local government formulates some policies, the final results achieved are not ideal. Because only a relatively small number of units and individuals can take proactive actions, it is impossible to effectively promote water pollution prevention and control.

4. Water Pollution Prevention Technology

4.1. Physical Methods

Physical methods are a technique that utilizes physical means to transfer pollutants from groundwater, including adsorption, gas diffusion, groundwater extraction, and artificial infiltration enhancement. The contaminated groundwater is transferred from the contaminated underground area to other areas through physical means to achieve the purpose of remediation. The method can directly degrade pollutants, the treatment efficiency is higher, the use of chemical agents is reduced, and the environmental pressure and energy consumption are reduced. But its operation cost is relatively high, there is no way to completely remove organic matter if the polluting components are more complex, the physical method often does not meet expectations, and the method has a relatively long treatment time, and is not suitable for all situations. Such as algae, the method may not be effective.

4.2. Chemical Methods

The chemical method mainly aims to treat pollutants by oxidizing and reducing them into harmless substances. Commonly used reagents include ozone, chlorine dioxide, etc. [3]. The cost is high, and attention should be paid to by-products during the treatment process to prevent the occurrence of secondary pollution. The reagent of the chemical method is easy to obtain, the decontamination is fast, the operation is simple, and it can be controlled remotely. But the decontamination rate of the rough porous surface is low, and the cleaning waste liquid volume is large and the composition is complex, which may cause the problem of secondary pollution. And is prone to corrosion and safety problems, and the chemical reagents used also need to be stored and collected, and the decontamination cost is relatively high.

4.3. Biological Methods

Biological methods achieve purification goals through the action of microorganisms. Biological methods are suitable for sites contaminated with biodegradable organic compounds, including petroleum hydrocarbons, benzene series, chlorinated hydrocarbons, etc. These organic compounds have a faster degradation rate and better purification effect [4]. The technology of this method is relatively mature. The process is simple. The treated sludge can be used as fertilizer, is easy to treat, and the cost is relatively low, for example, the sludge after ozone treatment also contains a large amount of organic matter, and the sludge can be used as fertilizer after removing heavy metals and drying it. But the bacteria used in biological treatment have relatively high requirements for water quality. If the pollution components are more complex, it will be trickier, and there are certain requirements for temperature. Equipment is also susceptible to microbial contamination, which can cause secondary contamination if not treated in a timely manner.

5. The Methods to Promote Water Pollution Control

5.1. Improving the Relevant Supervision and Management Mechanism

Law enforcement authorities have stepped up law enforcement efforts to severely punish enterprises and residents who litter in violation of regulations, and to carry out criticism and education, to prevent the pollution of water resources caused by direct discharge. Furthermore, by improving the incentive system for supervision and management and strengthening the overall supervision of water pollution, people can effectively prevent water pollution incidents. Countries and regions must establish unified water pollution prevention and control management institutions to address these issues. This includes ending the phenomenon of no one supervising a certain watershed. In addition, it is necessary to strengthen leadership management. Leaders who cannot actively and effectively control water pollution should be criticized and held accountable. At the same time, coordinate and cooperate with local governments to ensure the efficiency of governance work [5].

5.2. Increase Citizen Engagement

To fundamentally solve the problem of water pollution, all government departments of various countries should take measures in line with their national conditions, raise citizens' awareness of environmental protection, and promote the concept of environmental protection through Internet technology. Starting from the students, organize more school publicity; Starting with the residents, organize small-scale environmental protection publicity activities. It is also possible to make self-made micro-films and disseminate them through the news media to make more people aware of the importance of protecting the environment. Improve the enthusiasm of citizens for water pollution control. Government departments should enhance transparency by timely publishing treatment progress and disclosing pollution concentrations on official websites. This helps citizens understand government measures and encourages citizen participation. In addition, government departments can also establish a relevant reward system to commend and reward citizens who can report and dissuade residents from illegal discharge and littering of factories promptly, and give appropriate rewards to citizens who can put forward reasonable opinions on water resource management.

5.3. Improving the Ability of Independent Innovation

Whether it is in the regulatory system or core equipment, it is necessary to improve the ability of independent innovation. Countries should help each other in scientific and technological innovation to improve sewage treatment systems. Encourage relevant science and technology enterprises to independently develop advanced sewage treatment technology, improve the manufacturing capacity of core treatment equipment, expand market channels, and share successful experiences with various countries. Governments should set up special subsidies for the environmental protection industry, reward enterprises that can independently innovate and efficiently equip equipment, increase investment in scientific research funds, encourage enterprises to establish innovation platforms, improve the industrial chain supply system, and develop new technologies, new equipment and new materials.

6. Conclusion

This paper mainly analyzes the sources, current situation, pollution treatment methods and how to improve the efficiency of water pollution control, so as to provide an appropriate reference for future water pollution control. According to the research in this paper, the proportion of pollution sources in different regions is different, and the largest source of wastewater discharge is industrial wastewater discharge. In order to promote economic development, various countries have put the development of industry in an important position. At the same time, the discharge of industrial wastewater is also increasing, and the future of the world's water environment is worrying. With the global warming in the past two years, more and more people realize that environmental problems

should not be underestimated. More and more people are joining the ranks to protect the environment. Water is the source of life, and people's survival is inseparable from water. Nowadays, there are limited methods of water pollution control, and there is no perfect treatment method. The most fundamental way is to raise citizens' awareness of environmental protection and reduce the sources of pollution. The amount of pollution is reduced, and the pressure on water pollution control will also be reduced and improved. It is also possible to start from the supervision and management mechanism and governance technology, strengthen the supervision mechanism, improve the treatment technology, and provide a research direction for water pollution control These methods can reduce secondary pollution and improve the efficiency of governance. In order to keep up with the pace of development of the times, water pollution control needs to continue to carry out reform and innovation.

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