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Tap Water Treatment Process

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Abstract: With the rapid decrease of available water resources, to satisfy the needs of human life, it is urgent to treat and purify the water resources of waterworks so that the purified water can satisfy people's needs. This article mainly elaborates on the current research progress of tap water treatment technology and advanced treatment technology. Provide some basis for the application of social enterprises and scientific research workers.

Keywords: Potable water treatment; tap water quality perception.

I. INTRODUCTION

Water is the basis of human existence, but with the acceleration of industrialization, the pollution of water resources worldwide is becoming more and more serious. Usually, the pollutants in drinking water mainly include organic matter and ammonia nitrogen. At present, the commonly used water treatment processes are mainly coagulation, precipitation, filtration, and chlorine disinfection, but they cannot effectively remove ammonia nitrogen and organic matter. And chlorine disinfection can produce harmful by-products. Drinking unclean water can seriously endanger public health and even affect the kidney and urogenital system. Under the situation of a significant reduction in clean water resources, it is urgent to treat the water resources of waterworks through an efficient water treatment process so that they can use it for domestic water.

II. THE CURRENT TREATMENT PROCESS OF WATER WORKS

1. **Membrane separation technology:** Membrane separation technology that helps in cleaning water and makes it suitable for drinking is – Membrane filtration. This process finds its use in food and beverages development, concentration and purification of dairy products such as yogurt and cheese. There are different types of membrane filtration which include Nano filtration, ultra-filtration, reverse osmosis and microfiltration. These types are used for particles of different types.
2. **Reverse osmosis:** It is a modern solution to waste water treatment and is becoming increasingly popular as it is capable of rejecting 99.9% of bacteria. In this process, the minerals present in water are deionized to make it fit for drinking. This process is general used to make saline ocean water clean by removing the salts from it. Generally most of the reverse-osmosis installation use a cross-flow to allow the membrane to clean itself continuously. This process finds frequent use in pharmaceuticals, boiler feed-water treatment, food and beverage and metal finishing.

3. **Water oxidation:** To break down water into its two basic elements, water oxidation is used. In this process, water is separated into its basic elements so that it can be made to use for other things. Oxygen being one of the element is used for filling oxygen tanks. Hydrogen is used a fuel. This treatment process improves the environment as a whole.
4. **Activated carbon treatment technology:** At present, an in-depth treatment of water resources in waterworks mainly uses activated carbon and other technologies. Activated carbon treatment technology is convenient and straightforward, economical, and reusable. The commonly used granular activated carbon (GAC) helps to remove compounds in drinking water to achieve the purpose of water purification. GAC filtration can remove the bad color, smell, taste, and organic compounds caused by water treatment, and also can remove pesticides and other heterogeneous organisms. During GAC filtration, adsorption, and biodegradation co-occur. Siwila et al used gravity-driven wooden filters combined with granular activated carbon to treat drinking water and found that the removal rate of bacteria can reach more than 99%, & also can remove organic matter, heavy metals, color, smell, and peculiar smell. And Moona et al found that the existing biological activated carbon filter maintains 90% of the filter media. While the new GAC promotes adsorption, biodegradation continues to helpful for remove natural organic matter. Sawana et al used cerium dioxide modified activated carbon to purify arsenic in drinking water. It found that CeO2 coated powdered activated carbon can effectively remove arsenic in drinking water through specific adsorption and condensation attraction. The removal ability of As (III) and As (V) was close to 12 mg/g. & removal was not affected by factors such as pH and salinity. And GAC adsorption can well control the controlled disinfection by-product (DBP). Liu et al found that the adsorption of GAC can remove the organic matter of soluble microbial products in 60% of water and reduce the formation potential of disinfection by-products by more than 70%. GAC is a more effective way to control the DBP derived from

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wastewater in water supply. Activated carbon treatment technology can effectively avoid the potential harm caused by chlorine disinfection in conventional water treatment processes. However, activated carbon treatment technology has the disadvantages of secondary pollution risk and inconvenient recovery. And analyze the membrane separation and activated carbon treatment technology currently used in waterworks, as shown in table.

Treatment process	Remove pollutants	Removal
Wooden filter-GAC	Bacteria, turbidity, and TSS > Fe, Pb, Ni, Al, and Zn >	99% 90%
Ceria modified activated carbon GAC	As(III) and As(V)	12 mg/g
	Soluble microbial product organic matter	60%

Table 1:Activated carbon treatment technology.

5. Biological treatment process: Biofilm water treatment technology is a kind of water treatment technology that has been developed rapidly in recent years. It has the advantages of small footprint and convenient management. It has been widely used in the treatment process of waterworks. This kind of biofilm has a long service life, and can effectively block microorganisms in the water and improve the safety of domestic water. However, its stability is susceptible to factors such as ambient temperature, dissolved oxygen, and toxic substances. Rittmann based on the membrane bioreactor (MBfR) of H2 can convert NO3 to N2, ClO4 to H2O and Cl^-, and can effectively remove many pollutants. Gilbert et al used a moving bed biofilm reactor to treat waste water and found that denitrification can be effectively carried out. The lack of treatment of heavy metals and other toxic substances in water bodies by the biofilm method for water purification is one of the defects in its application to the actual purification of water sources.

II. CONCLUSION

There are more and more treatment processes for purifying tap water, but each has its advantages and disadvantages. Therefore, in practical applications, we need to select the treatment process following the actual situation to achieve the purpose of purifying tap water, thereby contributing to the safe and reliable drinking water that humans can drink. The advanced treatment process is essential for the purification of tap water. The development of new, efficient, sustainable, and diversified treatment processes is a research focus in the future.

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