

Chemical wastewater treatment using pistia plant

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Abstract: Water plays an important role in the main processes occurring in nature, as well as in human life. In industry, water is used as a raw material and energy source, as a cooling or heating agent, as a solvent, as an extractant, as a medium for transporting raw materials and materials, and for a number of other purposes.

Keywords: chemical properties of water, physical properties of water, water pollution, water wastage, fresh water problem, mechanical cleaning method, chemical cleaning method, physical cleaning method, biological cleaning method

INTRODUCTION

It has been more than half a century since the problem of ecological and biological safety has left the national and regional framework and become a common problem of all mankind. While nature and man interact with each other on the basis of certain laws, the violation of these laws can cause irreparable disasters to mankind. No matter where you look in the world, it is becoming natural to face various environmental problems. The Central Asian region cannot be called a zone free of environmental problems. President I.A.Karimov spoke about global ecological threats and problems and said, "Ecology is one of the acute social problems of the present time, its solution is in the interests of all nations, and the present day and future of civilization largely depends on the solution of this problem." He emphasized that it is "liqdir". Therefore, in order to solve environmental problems, our state has developed a program on environmental protection and rational use of natural resources. In this program, issues such as avoiding the release of substances dangerous for public health into the atmosphere and water bodies as much as possible, radically improving the ecological situation in the Republic, transitioning to low-waste and zero-waste technology in production, and developing measures for the economical use of natural resources z is reflected.

METHODOLOGY

Wastewater is divided into domestic, fecal, atmospheric and industrial wastewater depending on the conditions of its formation. Domestic wastewater is the water produced from shower, washing, bathroom, laundry room, dining room, toilet, floor washing. These waters contain approximately 58% organic and 42% mineral compounds. Atmospheric wastewater is the water that comes from rain and snowmelt and flows out of the enterprise area. They are contaminated with organic and mineral additives. The degree of harmfulness of wastewater depends on the nature and composition of pollutants (toxicity) in it. Heavy metal salts, cyanides, phenols,

hydrogen sulfide, carcinogens and other similar substances cause high level of poisoning and odor of wastewater. As a result of solar radiation and fresh water flowing into dirty water, the water is purified again. Various bacteria, fungi and algae are active agents in water repurification. If the water is oversaturated with various impurities, various independent or complex methods are used to clean it. In order to create a closed system of water supply, industrial waste water is purified to the required quality of water by mechanical, chemical, physical-chemical, biological and thermal treatment methods, depending on the type of enterprise. In addition, the mentioned methods include recuperative and destructive methods.

Recuperative methods are aimed at extracting all valuable substances from wastewater and then reusing it. In a destructive way, water pollutants are broken down using oxidation or reduction methods. Decomposition products are separated from water in the form of gas or sediment. The selection of cleaning methods is carried out taking into account the following factors. Landscaping area. This is a specially prepared plot of land that is simultaneously used for wastewater treatment and agro-industrial purposes. In such conditions, wastewater treatment is influenced by the movement of the sun and air, and the life activity of plants. Bacteria, actinomycetes, yeasts, algae, protozoa and invertebrates are present in landscaping areas. Wastewater contains mainly bacteria. In mixed biocenoses in the active layer of the soil, there is a complex interaction of symbiotic and competitive microorganisms. The amount of microorganisms depends on the seasons. They are less in winter than in summer. If the land area is not planted with agricultural crops and it is intended for the biological treatment of wastewater, such areas are called filtration areas. After biological treatment of the waste water of the lands in the improvement area, the fertilizers are used for the purpose of greening of spiky plants, various vegetables, as well as trees. The results of hydrochemical and microbiological studies show that it can completely biologically clean various wastewaters in 12-15 days.

Creation of ecologically safe and economically inexpensive and effective methods of biological treatment of wastewater is one of the important factors of water resources protection. There are various methods of wastewater treatment. Currently, it is recommended to use the biological method of wastewater treatment, that is, treatment with the help of high water and wetland plants. As a result of our many years of scientific research, agricultural enterprises (complexes for fattening cattle, poultry) and industrial enterprises (hemp processing, production of mineral fertilizers, biochemistry, oil and oil enterprises, cocoon enterprises, textile industry) and municipal waste water from organo-mineral substances, heavy metals, cyanides, oil products and pathogenic microorganisms using high water plants - pistia, eichhornia and azolla - a new effective biotechnology has been created. Pistia (*Pistia stratiotes* L., Araceae), Eichhornia (*Eichhorpia crassipes* Solms., Poptederiaceae) and Azolla

(*Azolla carolipiapa* Willd., sem. Azollaceae) are perennial plants that float on the water surface and are tropical and widespread in subtropical regions. Currently, these plants have been successfully introduced to the conditions of Uzbekistan. According to the results of our conducted hydrochemical and microbiological studies, it can completely biologically clean various wastewaters in 12-15 days.

During this time, the number of saprophytic microorganisms increases up to a thousand times, and bacteria of the group of intestinal bacilli are not found at all after three to four days. The amount of microflora in the water is sharply reduced, and the microscopic fungi considered pathogenic for plants and animals disappear. The physical and chemical parameters of water are improved, that is, the level of oxidation of water is reduced, nitrogen and phosphorus ions in water are almost completely absorbed by plants, the amount of dissolved oxygen in water increases, wastewater becomes clearer and has an odor. disappears. Water purified by *Pistia*, *Eichhornia*, and *Azolla* can be used for technical purposes, such as washing barns, watering agricultural crops, thawing hemp stalks, or discharging it into fishponds and open water bodies. *Pistia* is a floating plant with shortened stems and flat leaves. In the conditions of introduction, the height reaches 20-40 cm. The leaves emerging from the root neck form a thick bundle, the upper part is green, and there are linear deep marks along the length. The entire surface of the leaves is covered with thick, multicellular, transparent hairs. Due to well-developed aerenchyma tissue in plant leaves, it grows floating on the water surface. The pistachio root system is 50-60 cm long and covered with many hairs.

Eichhornia is a floating plant, 30-40 cm tall. Spoon-shaped; smooth, green, glossy leaves are oval in shape; the edges are straight, parallel to the symmetrical length, and the veins are clearly visible. Aerenchyma, an air-filled globular stem based on leaf bands, keeps the plant floating on the surface of the water. The hairs of the pubescent root system are well branched. From the base of the shortened stem, up to 15-20 leaf sheaths are added, and the growing first-order lateral roots are developed. The lateral roots of the second order up to 2.5 cm long are located horizontally in the water. *Azolla* floats on the surface of the water and grows up to 0.7-1.8 cm long. In the upper part of the sporophyte, 2 rows of small leaves cover the branch like coins placed on top of each other, and in the lower part of the body, a 2.0-2.5 cm long root is formed. According to the leaf structure, it is highly developed, that is, each leaf consists of two segments: the upper segment is green, located on the surface of the water level; and the lower segment is located at the bottom of the water and serves to absorb substances dissolved in the water. The optimal period of gross reproduction of *Azolla* is July-September, during which it produces 250-300 g/m² of biomass per day. 1500-2000 kg of wet biomass per night from 1 ha of water surface of *Azolla* grown in wastewater; and *pistia* and *eichhornia* can give up to 1800-2700 kg of wet or 90-135 kg of absolute dry

biomass (in June-October). Biomasses of aquatic plants are planted as seedlings in biological ponds of wastewater treatment facilities or treated with heat (AVM-0.65, AVM-1.5) to prepare vitamin flour, as protein-vitamin and mineral feed for agriculture. it can be used as additional feed for livestock and poultry. Also, as a result of using azolla as a "green fertilizer" in rice cultivation, the yield of rice increased by 20-25% compared to the control option, and the economic efficiency obtained from 1 hectare of rice field was 500,000 (five hundred thousand) soums in 2008. In 2012, the economic efficiency obtained by saving electricity and chlorine and its compounds used in the disinfection of wastewater as a result of wastewater treatment using pistia, eichhornia and azolla at the Angren "Suvokova" treatment plant amounted to 306 million (three hundred and six million) soums. Aquatic plants can also be used to decorate ponds to increase the diversity of ornamental plants.

CONCLUSION

It is the first duty of the officials to ensure the rational use and protection of water, the purification and processing of waste water at the republic level. Various infectious and non-infectious diseases are caused among people due to various pollution sources. These are dangerous infectious diseases such as stomach and intestines, jaundice, cholera, typhoid fever, para typhus. It has been determined that water contains about 65 trace elements. More than 20 of them are iodine, fluorine, molybdenum, copper, iron, etc., which are very necessary for the needs of the body. Various infectious diseases arise from the increase or decrease of these elements. For example: gout, careis, feluarosis. It is important to provide the population with clean drinking water. Drinking water must meet the requirements of special state standards and be the focus of permanent health care facilities. Basically, it is necessary to use chlorination or ozonation, as is currently the case in most countries, to purify water from various disease-causing bacteria. We are now suffering from the mistakes made by previous generations. Today, if we do not stop the mistakes made in this regard, the situation of the future generation may be even worse.

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