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ECONOMIC EFFICIENCY OF USING AQUATIC PLANTS IN BIOLOGICAL WASTEWATER TREATMENT

Alibekova Nazira Nazarovna
Jizzakh Polytechnic Institute

Abstract
Currently, new waste management technologies are being introduced. To date, a number of measures and activities are being developed aimed at improving the living conditions of the population and preventing environmental pollution.
The article also introduces current issues, i.e. new biological methods of waste treatment, technologies for the use of plants are being introduced. The cleanup is expected to have no negative impact on the environment and to achieve greater economic efficiency.

Keywords: water supply, wastewater, biological treatment method, wetland plants, microflora, biomass

The protection of the environment from anthropogenic impacts is currently receiving great attention on a global scale. The rapid development of industry, including the chemical industry, an increase in the extraction of raw materials, an increase in the use of transport lead to the fact that a large amount of waste enters the environment. Pollution of the environment (water, air, soil) leads to disruption of the normal functioning of the hydrosphere and biosphere, climate change, extinction of plant and animal species, deterioration of public health The problem of pollution of the hydrosphere by wastewater is relevant. becomes relevant in the world, including in Uzbekistan.
Various technological, sanitary, organizational and other measures are being taken to reduce and prevent environmental pollution, to effectively manage and protect water resources.
In our republic, the sustainable development of society, the vital signs of the population, the ecological state of the area are closely related to the efficiency of engineering communications. The creation of new systems of engineering communications, the use of modern technologies in improving existing ones, the use of geographic information systems are among the most pressing issues.
Providing the population with high-quality and required quantity of water, wastewater disposal and purification to the required level at the facilities is important from a sanitary and hygienic point of view. Provision of drinking water, discharge and treatment of sewage improves the standard of living of the population and prevents various diseases transmitted through water.
Currently, great importance is attached to the prevention of pollution of water bodies. Wastewater from domestic and industrial enterprises is treated at facilities and discharged back into water bodies.

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At the same time, it pollutes water bodies to a certain extent. In recent years, our state has taken a number of practical measures aimed at improving the sanitary condition of water bodies. In particular, the communal sector, which is considered the most important component of the territorial infrastructure of our country, creates the necessary conditions for a decent life for people, ensures the comfort and well-being of homes and settlements in all aspects, and the improvement of its activities by the President of the Republic of Uzbekistan for 2017-2021 April 20, 2017 on the program for the integrated development and modernization of drinking water supply and sanitation systems. At present, the results of hydrochemical and microbiological studies show that it can completely biologically treat various waste waters in 12-15 days. The creation of environmentally safe and economically inexpensive and efficient methods of biological wastewater treatment is one of the important factors in the protection of water resources. There are various methods of wastewater treatment. Currently, it is recommended to use the biological method of wastewater treatment, that is, cleaning with the help of floods and marsh plants.

As a result of our many years of scientific research, agricultural enterprises (complexes for fattening livestock, poultry) and industrial enterprises (hemp processing, mineral fertilizer production, biochemistry, oil and oil refineries, cocoon enterprises, textile industry) and urban wastewater are treated organically, a new effective biotechnology of biological purification from mineral substances, heavy metals, cyanides, oil products and pathogenic microorganisms using aquatic plants - pistia, eichornia and azolla.

Pistia - (Pistia stratiotes L., Araceae), eichhornia (Eichhorpia crassipes Solms, Poptederiaceae) and Azolla (Azolla carolipiapa Willd., family Azollaceae) are perennial plants floating on the surface of the water and widespread in the tropics and subtropics. At present, these plants have been successfully introduced in the conditions of Uzbekistan. According to the results of our hydrochemical and microbiological studies, it can completely biologically purify various wastewater in 12-15 days. During this time, the number of saprophytic microorganisms increases up to a thousand times, and the bacteria of the enterococci group do not appear at all after three to four days. The amount of microflora in water is sharply reduced, microscopic fungi disappear, which are considered pathogenic for plants and animals. The physical and chemical parameters of water improve, that is, the level of water oxidation decreases, nitrogen and phosphorus ions in water are almost completely absorbed by plants, the amount of oxygen dissolved in water increases, wastewater becomes cleaner, and the smell disappears when used. Water purified by Pistia, Eichhornia and Azolla can be used for technical purposes such as washing barns, watering crops, thawing hemp stalks, or dumping into fish ponds and open water. Pistia is a floating plant with short stems and flat, paddle-shaped leaves. Under conditions of introduction, the height reaches 20-40 cm. The leaves extending from the root collar form a thick bunch, the upper part is green, there are linear deep marks along the length. The entire surface of the leaves is covered with dense, multicellular,

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transparent hairs. Thanks to the well-developed aerenchyma tissue in the leaves of plants, it floats on the surface of the water. The root system of the pistachio is pubescent, 50-60 cm long, covered with many hairs.

Eichornia is a floating plant 30-40 cm high. Spoon-shaped; smooth, green, glossy oval leaves; edges are straight, parallel to symmetrical length, veins are clearly visible. At the base of the aerenchyma leaf bands, an air-filled spherical stem holds the plant 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 join and growing lateral roots of the first order develop. Lateral roots of the second order, up to 2.5 cm long, are located horizontally in the water.

Azolla - grows floating on the surface of the water and reaches a length of 0.7-1.8 cm. In the upper part of the sporophyte, 2 rows of small leaves cover a branch like coins placed on top of each other, and in the lower part of the body a root 2.0-2.5 cm. long is formed. By structure, the leaf is highly developed, i.e., 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 water. The optimal period for gross reproduction of Azolla is July-September, during which it produces 250-300 g/m2 of biomass per day. Azolla grown in wastewater can produce up to 1500-2000 kg of wet biomass per hectare of water per night; and Pistia and Eichhornia can produce up to 1800-2700 kg of wet or 90-135 kg of absolutely dry biomass (in June-October).

The biomass of aquatic plants is planted in the form of seedlings in biological ponds of treatment facilities or treated with heat (AVM-0.65, AVM-1.5) for the preparation of vitamin flour, feeding to farm animals and poultry as protein-vitamin and mineral feed. Complementary food to the diet. Also, as a result of the use of azolla as a "green fertilizer" in the cultivation of rice, the yield of rice increased by 20-25% compared to the control variant, and the economic efficiency obtained from 1 hectare of the rice field amounted to 500,000 (five hundred) thousand) soums. 2008. In 2012-2018, 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 pestia, eichornia and azolla at the Angren treatment plant “Suvokova” amounted to 936 million nine hundred and thirty six million) soums.

In conclusion, we can say that in the conditions of Uzbekistan, in order to increase the diversity of ornamental plants, we recommend using these aquatic plants for purification and reuse of water in enterprises and government institutions.

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