ISSN: 2181-3337 SCIENCE AND INNOVATION
INTERNATIONAL SCIENTIFIC JOURNAL
2022
№ 3

# TREATMENT OF WASTE WATER USING TECHNICAL, HYDROLOGICAL-GEOGRAPHICAL, MECHANICAL, PHYSICO-CHEMICAL AND BIOLOGICAL METHODS

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*https://doi.org/10.5281/zenodo.6820687*

***Abstract.*** *In this article, technical and waste water polluted by various wastes, mainly produced by industry and household, classification of their levels of pollution into classes, methods of treatment of processed water according to these levels by technical, hydrological-geographical, mechanical, physico-chemical and biological methods and Information about technological characteristics is given.*

***Keywords:*** *technical, hydrological-geological, mechanical, physico-chemical, biological treatment, arid, reclamation, filter, extraction, flotation, oxidation, sorption, coagulation, ion exchange, expanded clay.*

# ОЧИСТКА СТОЧНЫХ ВОД С ИСПОЛЬЗОВАНИЕМ ТЕХНИЧЕСКИХ, ГИДРОЛОГИКО-ГЕОГРАФИЧЕСКИХ, МЕХАНИЧЕСКИХ, ФИЗИКО-ХИМИЧЕСКИХ И БИОЛОГИЧЕСКИХ МЕТОДОВ

***Аннотация.*** *В этой статье приведены технические и сточные воды, загрязненные различными отходами, в основном промышленными и бытовыми, классификация уровней их загрязнения по классам, способы очистки обработанной воды в соответствии с этими уровнями техническими, гидрологико-географическими, механическими, физико-химическими и биологическими методами и информация о технологических характеристиках. дано.*

***Ключевые слова:*** *техническая, гидролого-геологическая, механическая, физико-химическая, биологическая очистка, аридная, рекультивация, фильтр, экстракция, флотация, окисление, сорбция, коагуляция, ионный обмен, керамзит.*

## INTRODUCTION

In our time, the need for water, which is considered a natural resource, is increasing along with the increase of people, the development of science and technology, and the variety of needs. As a result of using the waters for different purposes, their structural characteristics are changing and they are being polluted with highly active radioactive substances. Currently, new methods and technologies of wastewater treatment are being developed every year due to scientific and technical progress. The question arises as to how much water purification is necessary, because it is a technology that requires a lot of money and effort. But despite this, the countries of the world are currently paying great attention to the process of water treatment, because if contaminated water is not treated, it will join other clean surface and underground waters and make them unusable.

## MATERIALS AND METHODS

Water purification by technical method. Technical water purification works include:

1) In order to prevent the depletion of water resources, reduce as much as possible the discharge of wastewater into rivers and mines, and then completely stop it. This method is based on the transition to a new technology of water supply to industrial enterprises, the introduction of

a closed cycle system in water use. This task is quite difficult, but it is possible to do it. Currently, some industrial enterprises in the USA and Germany, the Chelyabinsk metallurgical plant in Russia, the Almalyk chemical plant in Uzbekistan, and several similar industrial giants have switched to a closed cycle system of water use. In these enterprises, only the part of water that is lost during the technological process is replenished with clean water. This amount does not exceed 10% of the water used. The rest is cleaned and returned to the cycle;[1]

2) Increasing the efficiency of treatment facilities and increasing their capacity based on the improvement of wastewater treatment methods. This method is currently used in many places. Water treated in treatment facilities can be used in some sectors of the economy. For example, after sanitary control, they can be used for irrigation of agricultural lands or in industrial enterprises that do not require high-quality water;

3) Comprehensive saving of fresh water, transfer of certain types of production to waterless technology. The development of science and technology has improved the technology of industrial production and made great achievements. For example, if earlier 20-30 m3 of water was used to process 1 ton of oil, in 1957 this amount was 7.97 m3, in 1960 it was 1.32 m3, in 1967 it was 0.84 m3, and in 1984 it was 0. It was 12 m3.[2]

4) Switch to replacing water with cold air flow in cooling aggregates in industrial enterprises. Up to 45% of water used in industry is used only for cooling purposes. Carrying out this work with the help of air flow allows to save up to 70-90% of water.

**RESULTS**

Water purification by hydrological-geographic method.

Water purification by the hydrological-geographical method is based on the management of water circulation in nature and the balance between land and water. This method is mainly aimed at maintaining the stability of the groundwater flow and increasing the moisture in the soil, and it includes the following:

1) Managing the order of river waters. This includes the construction of reservoirs on rivers, thereby eliminating the risk of floods, and replenishment of water from the reservoir during periods of low river water. In some places, the level of groundwater may rise and the salinity of the land may increase, but the damage caused by this is insignificant compared to the benefits of regulating the river water in the reservoir. The total water volume of such reservoirs in the early 70s was 100 million. m3, within ten years this amount will be 410 million. came out to m3. The Tuyamoyin reservoir, which was built in Amudarya in the 1990s, can be included in the list of such reservoirs.

2) construction of underground water reservoirs, i.e. artificially increasing the volume of underground water at the expense of surface water. This method is widely used in developed countries where there is a shortage of water. Used in flood waters and businesses cleaning the waters. as a result of collecting in underground reservoirs, 2 billion of clean water is taken from them per day in the USA. Germany, Turkey and other countries also have underground reservoirs.[3]

3) Implementation of land reclamation measures to maintain soil moisture, expansion of forest and forest areas, in order to provide adequate water supply to agricultural fields. Implementation of reclamation works in irrigated agriculture is an important method of effective use of water. These include efficient use of water, rain, drip and wet irrigation, concrete canals, and construction of ditches.

The comprehensive approach to water use involves the comprehensive planning of water supply tasks, taking into account the natural features of the land, the prospective development of irrigation, industry, energy and communal economy in the planning of water use.

Organizational measures play an important role in the protection of water resources and their efficient use. These measures include monitoring the quality of water, establishing control over wastewater treatment, preventing the spillage of oil and other pollutants into water bodies, establishing control over the use of water by enterprises, and the sources that provide the population with drinking water. control of biological, chemical and bacteriological conditions, examination of project documents of newly built enterprises, preventing their operation without treatment facilities, and many similar measures, which ultimately have an incomparable importance in the protection of water resources.

**DISCUSSION**

Contaminated water is cleaned in special water treatment facilities mainly in three different ways:

- Mechanical cleaning method.

It is carried out by seepage, settling, inertial separation, filtration and oil extraction methods. During filtration, water-insoluble compounds are passed through special iron grids and wires with a mesh size of 5-25 mm, and hard objects are caught. The search is carried out in a special pool. In this case, some substances in water that have been cooled for up to 1.5 hours sink to the bottom of the water with their own weight. This clarified water is filtered through a bed (usually granular sand) at the bottom of the clarifier. Inertial separation is performed in hydrocyclones. Their working principle is similar to air-purifying cyclones, and some impurities in the circulating water flow are separated by inertial force;

- Physico-chemical cleaning method.

Solids and suspended solids and substances dissolved in water are cleaned. Physicochemical purification is performed by extraction, flotation, oxidation, sorption, coagulation and ion exchange methods. Extraction is the process of separation of a mixture between two insoluble liquids (extractant and wastewater) (for example, phenol in the wastewater is extracted using benzene). Flotation is the process of foaming and floating to the surface of the water with the help of air bubbles supplied from below. Neutralization is the process of regulating the acidity and alkalinity (pN) of wastewater by adding acid, lime, soda, ammonia, etc. Oxidation is based on the neutralization of toxic biological compounds in wastewater and drinking water by adding chlorine. Sorption is the process of extracting heavy metals, hydrocarbons and dyes from water using sorbents.

Activated carbon is often used as a sorbent. Wood shavings, soot and titanium pieces are also used in this work. Coagulation is the process of adding special chemicals (coagulants) to drinking water and removing some impurities dissolved in it. Aluminum or iron compounds are used as coagulants. Electrocoagulation is used in wastewater treatment. In this case, heavy metals and sulfates in the wastewater ionize and accumulate around the electrodes. Ion exchange is a water pollutant on the surface of ion exchange resins based on the adhesion of some compounds and heavy metals; [4]

- Biological treatment method.

It is based on the purification of organic impurities in wastewater as a result of aerobic biochemical processes, and this process can be carried out in natural and artificial conditions.

Purification in natural conditions is based on filtering dirty water through the soil in special areas. In this case, an 80 cm thick soil layer is sufficient for water purification. In artificial conditions, sewage is treated with biomaterials. Biomaterials have biofilters (aerotanks) and this method is also based on filtering water. At the bottom of the biomaterial is a biofilter layer made of granular porous material, and aerobic microorganisms form a film on the surface of this layer. This film is often referred to as "living mud" or "activated mud". Here, organic impurities in the water are decomposed biochemically, and dirty water is cleaned by seeping through the granular layer. As a biofilter, expanded clay, gravel, pebbles and granular sand can be used.

**CONCLUSIONS**

Experiments conducted at the "Vodgeo" Tashkent Scientific Research Institute show that 86.7% of ammonium nitrogen is removed from water leaked from expanded clay in half an hour, and 95.6% in one hour. Biotechnological treatment of industrial effluents also gives positive results. Using microscopic algae (for example, Xenodesmus) as a biofilter, it is possible to remove ammonia, nitrites and nitrates from light industrial effluents.[5]

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