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MONITORING OF WATER POLLUTION IN HOT CLIMATES

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ABSTRACT

It has long been noticed the tendency of mankind to hang catchy labels on everything that comes to hand, especially on any epoch-making events. So the twentieth century, which has sunk into the past, was called - oil and nylon, nuclear and space, information and computer. The coming age from its very threshold is often called the water age, and inveterate pessimists do - the age of water wars. Meanwhile, scientists have long calculated that approximately 1366 million cubic kilometers of water have accumulated on our small planet, or more than two hundred million tons per average earthling. But for a completely comfortable existence, hundreds of tons of water per year are more than enough for an earthling, if we focus on reasonable standards for domestic water supply. And each of these tons, obeying the inexorable world cycle, sooner or later returns to the bosom of nature, so why sound the alarm? However, there is more than enough reason for concern. 97.5% of the planet's water resources located in the seas, oceans and depths of the earth are not yet suitable for consumption due to excessive mineralization.

Key words: Wastewater, sewerage, open reservoirs, health, aerotank, treatment facilities, disinfection, sources of drinking water supply

INTRODUCTION

Water is an invaluable gift of nature. Water is of great importance in the existing manufacturing sector and in the national economy. Everyone knows the living conditions of the population, the need for water for flora and fauna. Water is a natural habitat for many species of living things. Freshwater scarcity is one of the major challenges facing the world today. The growing demand for water in the manufacturing sector and agriculture makes it difficult for the whole world to find different sources of solutions to this problem [3]. The expansion of cities, the rapid development of production, the steady growth of agriculture, the significant expansion of irrigated fields, the improvement of cultural and living conditions, and a number of other factors are further complicating water supply problems. The following areas of water use remain relevant at the present stage; these include more rational use of water resources and expanding the recovery of freshwater resources; development of new technological processes that will prevent pollution of water resources. When water bodies of economic and cultural significance are considered polluted, the composition and properties of water at the point of use must be directly or indirectly affected by economic activities, domestic use and be found to be partially or completely unfit for use [1].

In many industrialized countries, the sanitary protection of water bodies is one of the most important tasks in connection with the growing demand for water for the domestic needs of the population [2].Water is necessary for all forms of life, as well as for most types of human activity. Water is extremely sensitive to changes in the natural environment associated with human activities, and this poses acute and persistent challenges to humanity. This delicate and unstable mechanism of interaction between man and water has existed since the emergence of mankind, and is now in a critical state as a result of the rapid development of industry and population growth. So, for example: 250 tons of water for the production of 1 ton of paper, -60-210 m^3 for the production of 1 ton of yarn, -1 ton for the production of fabrics - 250 m^3, for the production of 1 ton of soap -50m^3, 1 ton of glue 240 m^3 for production, -130m^3 for the production of 1 ton of pipes, -25m^3 for the production of 1 ton of oil, 385m^3 for the production of cellulose, -84 m^3 for the production of margarine, -30m^3 for the production of 1 ton of metal structures (.....) water is consumed. According to G.G. Onishenko, water consumption in developed countries (2016) has increased 15 times over the past 20 years, and water consumption for domestic purposes amounted to 500 million m^3 per day. The economic and domestic activities of modern society are so closely connected with the use of natural waters that daily knowledge of the condition of water bodies and early detection of changes in their regime has become a priority. Along with the increase in water supply, the amount of wastewater discharged into water bodies is also increasing. According to Drachev S.M. [2019], the amount of wastewater in the United States in 2019 increased 4.6 times compared to 2012-2014. The increase in wastewater is accompanied by an increase in water pollution in a number of countries [7]. A number of scientists have shown in their work that aggressive pollution of water bodies in industrialized countries [Key A, B; Klein L., Pescroix P., Filg O., Petrilli F.L., Porges R 2015]. This condition has not stopped to date [Hillis P., Padley M.B., Powell N.I., Gallagher P.M. Effects of backwash conditions on out-to-in membrane microfiltration, Desalination, 118, 197-204, 2019.]. At present, the problem of protection of natural waters from pollution has covered almost all economically developed countries.

Especially the water basins of the Netherlands, Italy, Sweden, England, Japan are heavily polluted with various chemical and biological substances. For example, the production of 24 million tons of polluted water from the Rhine annually leads to the discharge of industrial wastewater into the sea.The Danube River, more than a hundred kilometers from the city of Krems to the Slovak border, has become a biologically dead basin in its composition [4]. Various chemicals, including highly toxic dioxins, enter the water basin with wastewater [I.A. Kryatov, E.A. Mojaev, 1998; Marsalen J.K., 1998; W.Pettenkoven, 1999; S.Marapoul et.el 1999; M.Nutten, C.Symon, 2000; H.H. Dieter, 2000]. Water contaminated with wastewater not only becomes unusable or less usable, but it also causes significant, often irreparable damage to the entire natural environment it affects. In polluted water, fish die, and other members of the plant and animal world become extinct. The solution to the problem of protecting water resources is mainly to protect them from wastewater pollution. Domestic wastewater retains about 60% of organic matter, which is especially important for sanitation. Pollutants entering wastewater can be conditionally divided into several groups. Hence, insoluble, colloidal and soluble additives are separated according to their physical composition. Typically, mineral contaminants are manifested in the form of sand, clay mixtures, metal particles, mineral salts, soluble acids, alkalis and other substances. Organic pollutants are divided into plant, animal and bacterial species according to their origin [1]. According to G.I. Sidorenko (2001), pathogenic bacteria and viruses are isolated from municipal wastewater, the excretion fund of which (in the central part of Russia) is up to 80%. It has been established that the duration of retention of pathogenic bacteria depends directly on the initial contamination dose. This means that at an initial concentration of 10 microbial cells in 1 ml of river water, Flexner's diarrhea bacteria survive for 9 days at a temperature of 19-24^{0}C for 3 days, at a dose of 10,000 per ml.

Studies conducted by I.V. Khanigin revealed that typhoid fever, enteroviruses: poliomyelitis, coxsackie V-3; V-4, ECHOs were detected when the wastewater in Irkutsk was poured into the Angar River after mechanical treatment. In this case, the wastewater is less effective for 30 minutes of contact with a large dose of chlorine (residual chlorp content - 0.5 mg/l). Discharge of wastewater containing large amounts of organic matter and various trace elements into an open water body can lead to the general development of bacteria, algae, fungi, contamination of river water with toxic substances, which can be a source of poisoning for fish, humans and pets. possible [G.Vogler, 1967; E.J.Curtis, C.R.Curgs, T.G.Kokoliya, 1971; A.N.Leventsev, 1990]. The rapid development of separate species of plankton and bectos in rivers often leads to deterioration of water quality [9]. Some algae and aquatic fungi give the water an unpleasant odor, saturating it with toxins, making it unsuitable for drinking and recreational purposes [7]. In addition, the coverage of rivers with biologically simple organisms can lead to an increase in the lifespan of pathogenic microflora entering the watershed or, conversely, to the destruction of pathogenic microorganisms [10]. It has been established that for some species of viruses, blue-green algae is a nutrient medium that is a good source of growth [11]. Discharge of wastewater containing large amounts of organic matter into an open body of water often results in the flooding of water bodies with Leptomitus Lacteus (hereinafter leptolitus). Many rivers are affected by this fungus: Volga, Kama, Yauz, Neva, Oka, Iya, Biryus. As soon as their colonies reach a certain size, they are cut off from the bottom of the water and from various objects in the water, and the water flows downstream for miles. As a result of slowing of water flow in deep places, biomass sinks to the bottom, accumulates, decomposes and secondaryly pollutes rivers with organic matter, which leads to a sharp decrease in dissolved oxygen in the cold season and creates unfavorable conditions for the development of others [11].

One of the main sources of water pollution is car wash points.Technological analysis of the car wash process allowed to determine the average amount of water used to wash one car a year in a public survey of car owners, which is estimated at 4.34 million m^3 of water used for car washing in Tashkent, and they are unfortunately not enough unfortunately the cannot be cleaned enough. 734 kg of suspended solids, 446 kg of petroleum products and 127 grams of UFMs enter the sewage system from one car wash. These substances disrupt the biological treatment process when they enter the municipal sewage system [3,4]. Currently, there are more than 125 car washes in Tashkent. One station uses 10,621.5 m^3 of fresh water per year. The resulting wastewater is mainly discharged into the sewer system without treatment or through sewers and without the necessary treatment. The water consumption for cars at the officially registered car washes in Tashkent is 1.33 million m^3. If we take into account that the number of cars in Tashkent (according to official statistics 417,646) consumes 200 liters of water for one wash and the car is washed once a week, the figure is 4.34 million m^3.

This does not include trucks, buses and special vehicles (Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to implement national goals and objectives in the field of sustainable development until 2030").

In the analysis conducted by Uzhydromet, the amount of pollutants in the Chirchik River (petroleum products, EKBBE, phosphates, iron), in the Karasu canal (nitrogen ammonium, nitrogen nitrite, phosphates, iron), Bozsu canal (nitrogen ammonium, phosphates, chlorides, petroleum products), In the Salor canal (sulfates, phosphates, iron, ammonium nitrogen) it was noted that it is higher than sanitary and hygienic standards. The major anthropogenic impact on Uzbekistan's water resources has been the drying up of the Aral Sea and the reduction of water saturation in the Amudarya delta. By 2005, the river had lost 5 to 4 parts of its volume, the water surface had shrunk by a third, and the water level had dropped to 22 m (Regional Action Plan to take measures against Desertification of the Aral Sea Basin (CRAPCD), 2000 (GTZ. Taking measures against Desertification). UN Convention on the Law of the Sea). Pollution of open water bodies is widespread and even leads to significant contamination of groundwater, including drilled wells. Water pollution of this group plays an important role in the growth of diseases (kidney, oncological and acute infectious diseases), mortality, including children. leads to an increase in mortality.

Anthropogenic impacts also lead to soil pollution (salinity, toxic substances, pesticides, fertilizer residues, heavy metal poisoning) and impact on public health (National Report on the of Water Reuse). Currently, the country's water resources remain unsatisfactory. The highest levels of mineralization and pollution are more common in the lower and middle reaches of the river. This poses a serious threat to the life and health of the population and resists the preservation of natural habitats. Sources of pollution are: agricultural irrigated lands (78%), manufacturing enterprises (18%) and the municipal sector (4%). Agricultural wastewater is the main source of pollution of open and groundwater (90%). Although industrial effluents are small in size, they are more harmful and dangerous in terms of their toxicity. According to the Water Pollution Index (WPI), there are seven classes of water quality from I (very clean water, WPI <0.3) to VII (extreme polluted SII> 10). Excessive use of agricultural chemicals (nitriates, phosphates, pesticides) leads to rapid pollution of agricultural lands and water sources, contaminated water from irrigated lands enters the collector-drainage system. This, in turn, leads to the contamination of open water bodies through collectors.

CONCLUSION

Water is the most important irreplaceable natural factor on earth. Its availability and quality depend on human health, the level of sanitary-epidemiological well-being, the comfort of living, and as a result, the social stability of society. The development of science and technology, the chemical industry and industry in general, the favorable living conditions of people lead to the pollution of water resources from year to year with different amounts and contents of wastewater. This will have a negative impact not only on the level of pollution of all types of open water bodies in the Republic of Uzbekistan, but also in the Central Asian region.

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